IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Mark Levine et al.
Serial No.	:	10/699,997
For	:	DURABLE HIGHLY CONDUCTIVE SYNTHETIC FABRIC CONSTRUCTION
Filing Date	:	November 3, 2003
Examiner	:	Andrew T. Piziali
Group Art Unit	:	1794
Confirmation No.	:	5362

745 Fifth Avenue
New York, NY 10151

December 3, 2008

APPEAL BRIEF OF APPELLANT

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is an Appeal from the Final Rejection by the Examiner dated Final Office Action mailed June 12, 2008, which issued in the above-identified application, finally rejecting claims 1-4, 7-14, 16, 17, 19, 20, 22-24, 27-34, and 36-40, and from the Pre-Appeal Brief Conference Decision dated November 3, 2008 confirming the rejections. A Notice of Appeal was filed on October 3, 2008. The period for response to Pre-Appeal Brief Conference Decision was set for December 3, 2008 and extendable under 37 CFR 1.136 based upon the mail date of the Decision. This Brief is submitted in accordance with 37 C.F.R. § 41.37 and is accompanied by the requisite fee of $540.00 as set forth in 37 C.F.R. § 41.20. Please charge any additional

fees required for the Notice of Appeal, or otherwise occasioned by this paper or credit any overpayments to Deposit Account No. 50-0320.

REAL PARTY IN INTEREST

The real party in interest is Albany International Corp., 1373 Broadway, Albany, New York 12204, to which Appellants have assigned all interest in, to and under this application, by virtue of an assignment recorded on March 8, 2004 at reel 015060, frame 0418; reel 015060, frame 0428; reel 015060, frame 0430; of the assignment records of the Patent and Trademark Office.

RELATED APPEALS AND INTERFERENCES

Upon information and belief, the undersigned attorney does not believe that there is any appeal or interference that will directly affect, be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF THE CLAIMS

The Application was filed with claims 1-38 on November 3, 2003 and assigned Application Serial No. 10/699,997.

In a first Office Action dated June 17, 2005, the Examiner required an election of a species under 35 U.S.C. §121.

The Examiner also rejected claims 12, 18 and 32 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner also rejected claims 1-4, 7-8, 11-16, 19-22, 27-28 and 31-36 under 35 U.S.C. §102(b) or in the alternative under 35 U.S.C. §103(a) over U.S. Patent No. 6,432,850 to Takagi.

Claims 9-10, 23, 29-30 and 38 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,432, 850 to Takagi as applied to 1-4, 7-8, 11-16, 19-22, 27-28 and 31-36, above and further in view of U.S. Patent No. 4,803,096 to Kuhn et al.

In response to this first Office Action, Appellants filed an Amendment on September 13, 2005 electing (pursuant to a teleconference) species 3, including claims 1-4, 7-24 and 27-38, amending claims 1, 12, 13, 15, 16, 21, 24, 32, 33, 35, 36, adding new claims 39 and 40, and arguing against the claim rejections.

The Examiner then issued a Final Office Action dated October 14, 2005 ("Final Office Action"), in which the Examiner withdrew the rejections under 35 U.S.C. §112 and maintained the remaining rejections in the first Office Action.

In response to this Final Office Action, Appellants filed a Request for Continued Examination with an Amendment on January 11, 2006. An Office Action was mailed March 30, 2006 maintaining the rejections in the Final Office Action.

In response to this first Office Action, Appellants filed an Amendment on June 30, 2006 amending claims 1, and 24 and arguing against the claim rejections.

Appellants held a teleconference with the Examiner, as documented in the Interview Summary dated July 10, 2006, in which claims 1, 15 and 16 were discussed.

The Examiner then issued a Final Office Action dated August 21, 2006, in which the Examiner withdrew the rejections of claims 15 and 35 and rejected claims 1-4, 7-8, 11-14, 16-17, 19-22, 24, 27-28, 31-34, 36-34, and 39-40 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,432,850 to Takagi in view of U.S. Patent No. 5,744,236 to Rohrbach et al. Claims 9-10, 23, 29-30 and 38 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,432, 850 to Takagi in view of U.S. Patent No. 5,744,236 to Rohrbach et al. as applied to 1-4, 7-8, 11-16, 19-22, 27-28 and 31-36, above and further in view of U.S. Patent No. 4,803,096 to Kuhn et al

Appellants held a teleconference with the Examiner, documented in an Interview Summary dated December 4, 2006, in which all claims were discussed.

In response to this Final Office Action, Appellants filed an Amendment on December 21, 2006 amending claims 1 and 24 and canceling claim 21 and arguing against the claim rejections.

The Examiner then issued an Advisory Action dated February 1, 2007 ("Advisory Action"), indicating that the December 21, 2006 response was not entered since the amendment raised new issues that would require further consideration and/or search.

Appellants them filed a Request for Continued Examination on February 16, 2007 appealing the Final rejection.

An Office Action was mailed April 9, 2007 maintaining the rejections in the Final Office Action. Claims 1-4, 7-8, 11-14, 16-17, 19-20, 22, 24, 27, 28, 31-34, 36, 37, 39-40 were rejected over U.S. Patent No. 6,432, 850 to Takagi in view of U.S. Patent No. 5,744,236 to Rohrbach et al. and further in view of U.S. Patent No. 3,842,465 to Sillaots et al. ("Sillaots") under 35 U.S.C. §103(a). Claims 9-10, 23, 29-30 and 38 were rejected under 35 U.S.C. §103(a) over over U.S. Patent No. 6,432, 850 to Takagi in view of U.S. Patent No. 5,744,236 to Rohrbach et al. and further in view of U.S. Patent No. 4,803,096 to Kuhn.

In response to this Office Action, Appellants filed an Response on July 9, 2007 arguing against the claim rejections.

The Examiner then issued a Final Office Action dated August 6, 2007 in which the Examiner maintained the remaining rejections in the first Office Action.

In response to this Final Office Action, Appellants filed a Response on October 25, 2007 providing links to websites and arguing against the claim rejections.

The Examiner then issued an Advisory Action dated November 1, 2007, indicating that the October 25, 2007; the evidence was not entered.

In response to this Advisory Action, Appellants filed a Request for Continued Examination on December 6, 2007 appealing the Final rejection and requesting the previously submitted response be considered.

An Office Action was mailed January 10, 2008 maintaining the rejections in the Final Office Action.

In response to this Office Action, Appellants filed an Amendment on April 18, 2008 amending claims 1-4, 7-14, 16-17, 19-20, 22-24, 39-40, providing evidence and arguing against the claim rejections.

The Examiner then issued a Final Office Action dated June 12, 2008 in which the Examiner maintained the remaining rejections in the first Office Action. Claims 1-4, 7-14, 16, 17, 19, 20, 22, 23, and 39 were also rejected under 35 U.S.C. §112, first paragraph, alleging failure to comply with the written description requirement. Claims 1-4, 7-8, 11-14, 16-17, 19-20, 22-24, 27-28, 31-34, 36-37 and 39-40 are were rejected over Takagi in view of Rohrbach and Sillaots or U.S. Patent No.5,830,983 to Alex ("Alex") under 35 U.S.C. 103(a). Claims 9-10, 23, 29-30, and 38 were also rejected under 35 U.S.C. 103(a) over Takagi in view of Rohrbach and Sillaots or Alex and further in view of Kuhn.

In response to this Office Action, Appellants filed an Amendment on September 12, 2008 amending claims 1-4, 7-14, 16-17, 19-20, 22-24, and 39 and arguing against the claim rejections.

The Examiner then issued an Advisory Action dated September 19, 2008, indicating that the September 18, 2008 amendment was not entered.

In response to this Advisory Action, Appellants filed a Notice of Appeal with a Pre-Appeal Brief Request for Review on October 3, 2008 appealing the Final rejection. A Notice of Panel Decision from Pre-Appeal Brief Review was mailed on November 11, 2008 maintaining the rejections in the Final Office Action. This Appeal Brief is being filed pursuant to the Notice of Appeal filed on October 3, 2008 and the Pre-Appeal Brief Conference Decision dated November 3, 2008.

Accordingly, the status of the claims may be summarized as follows:

Claims Withdrawn: 5-6, 25-26

Claims allowed: None.

Claims Objected to: None.

Claims Rejected: 1-4, 7-14, 16-17, 19-20, 22-24, and 39

Claims Appealed:

Claims Canceled: 15, 18, 21, 35

Rejected claims 1-4, 7-14, 16-17, 19-20, 22-24, and 39 are set forth in the Appendix attached hereto. Appellants are appealing the Final rejection of claims 1-4, 7-14, 16-17, 19-20, 22-24, and 39, which constitute all of the currently pending claims in this application.

STATUS OF THE AMENDMENTS

Appellants filed an Amendment on September 12, 2008 amending claims 1-4, 7-14, 16-17, 19-20, 22-24, and 39. The Examiner then issued an Advisory Action dated September 19, 2008, indicating that the September 18, 2008 amendment was not entered.

Appellants believe that all the remaining submitted Amendments have been entered.

SUMMARY OF THE CLAIMED SUBJECT MATTER

The citations to Figures and Specification locations are provided immediately following elements of independent claims 1, and 24 which Appellants summarize below. However, such citations are merely examples and are not intended to limit the interpretation of the claims or to evidence or create any estoppel.

Claim 1 is directed toward an industrial belt used in making nonwoven textiles in the airlaid, meltblown or spunbonding processes comprising a conductive engineered fabric. Page 4,

lines 5-9. The fabric comprises a plurality of polymeric filaments having one or more C-shaped grooves with a mouth having a width less than the width of a central portion of the groove formed therein. Page 5, ln. 26- page 6, ln. 3; Figure 1, ref. no 18. Each filament includes electrically conductive polymer material incorporated as either a blend or a coating that substantially fills the C-shaped grooves. Page 4, lns. 21-32; Figure 1, ref. no. 14. The conductive fabric has static dissipation properties comparable to metal-based fabrics whilst being resistant to dents and creases. Page 4, line 32 to page 5, ln. 7. One or more C-shaped grooves allow for continued exposure of the conductive polymer to the filament surface as the monofilament wears so that the filament retains its conductivity. Page 6, lns. 8-12.

Claim 24 recites an industrial belt polymeric filament said polymeric filament having one or more C-shaped grooves with a mouth having a width less than the width of a central portion of the groove. Page 5, ln. 26- page 6, ln. 3; Figure 1, ref. no 18. The C-shaped grooves are substantially filled with electrically conductive polymer material mechanically locked in place. Page 4, lns. 21-32, page 5, ln. 32 to page 6, ln. 8; Figure 1, ref. no. 14. The one or more C-shaped grooves allow for continued exposure of the conductive polymer to the filament surface as the monofilament wears so that the filament retains its conductivity. Page 6, lns. 8-12.

GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1-4, 7-14, 16, 17, 19, 20, 22, 23, and 39 comply with the written description requirement under 35 U.S.C. §112, first paragraph.

Whether claims 1-4, 7-8, 11-14, 16-17, 19-20, 22, 24, 27-28, 31-34, 36-37 and 39-40 are patentable over U.S. Patent No. 6,432,850 to Takagi ("Takagi") in view of U.S. Patent No. 5,744,236 to Rohrbach et al ("Rohrbach") under 35 U.S.C. §103(a).

Whether claims 1-4, 7-8, 11-14, 16-17, 19-20, 22, 24, 27, 28, 31-34, 36, 37, 39-40 are patentable over Takagi in view of Rohrbach and further in view of U.S. Patent No. 3,842,465 to Sillaots et al. ("Sillaots") under 35 U.S.C. §103(a).

Whether claims 1-4, 7-8, 11-14, 16-17, 19-20, 22-24, 27-28, 31-34, 36-37 and 39-40 are patentable over Takagi in view of Rohrbach and Sillaots or U.S. Patent No.5,830,983 to Alex ("Alex") under 35 U.S.C. 103(a).

Whether claims 9-10, 23, 29-30 and 38 are patentable under 35 U.S.C. §103(a) over Takagi in view of Rohrbach and further in view of U.S. Patent No. 4,803,096 to Kuhn.

Whether claims 9-10, 23, 29-30, and 38 are patentable under 35 U.S.C. 103(a) over Takagi in view of Rohrbach and Sillaots or Alex and further in view of Kuhn.

ARGUMENTS

I. THE REJECTIONS UNDER 35 U.S.C. § 112 ARE IMPROPER AND IN ERROR

Claims 1-4, 7-14, 16, 17, 19, 20, 22, 23, and 39 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner alleges that the term "belt" is not supported. Claims 1 and 24 are independent. As regards the rejections under 35 U.S.C. §112, the Examiner has refused to enter the amendment such that the claims recite "fabric" instead of "belt." The amendment was proffered only as an accommodation to render language of the claims consistent with that of the Specification. The amendment in no way changes the scope of the claim.

Indeed, the Examiner's rejection is based on a fundamental misreading of the Specification, as he alleges at page 2 that "[t]he specification discloses that the current invention may be drawn to a fabric used in making non-woven textiles and/or spunbonding process <u>or</u> the invention may be drawn to a fabric used in a dry application such as a belting media (page, 4 lines 5-13)." The Specification as cited, however, actually says "the invention is also applicable other industrial fabrics used in **any** "dry" applications where the dissipation of static electricity is required, through **the belting media**." Emphasis added. As an ordinarily skilled artisan would readily understand, a fabric used in making non-woven textiles and/or spunbonding process is just such a dry application, and is "the belting media." Moreover, an ordinarily skilled artisan would readily understand that an industrial fabric used in making nonwoven textiles in the airlaid, meltblown, or spunbonding process is in belt form, as the very language of the Specification indicates. Accordingly, the rejection under section 112 is improper, and should be withdrawn.

II. THE REJECTIONS UNDER 35 U.S.C. §103 SHOULD BE WITHDRAWN

a. Claims 1 and 24 are patentable and non-obvious over Takagi in view of Rohrbach

Claims 1-4, 7-8, 11-14, 16-17, 19-20, 22, 24, 27-28, 31-34, 36-37 and 39-40 were rejected under 35 U.S.C. §103(a) over Takagi in view of Rohrbach. For the reasons given below, Appellants traverse.

Claim 1 recites:

> **An industrial belt used in making nonwoven textiles in the airlaid, meltblown or spunbonding processes** comprising a conductive engineered fabric comprising a plurality of polymeric filaments **having one or more C-shaped grooves with a mouth having a width less than the width of a central portion of the groove formed therein**, wherein each filament includes **electrically conductive polymer material incorporated as either a blend or a coating that substantially fills the C-shaped grooves**, said conductive fabric **having static dissipation properties comparable to metal-based fabrics whilst being resistant to dents and creases** and wherein the **one or more C-shaped grooves allow for continued exposure of the conductive polymer to the filament surface as the monofilament wears so that the filament retains its conductivity**. (Emphasis added)

Claim 24 recites:

> **An industrial belt polymeric filament** said polymeric filament having **one or more C-shaped grooves with a mouth having a width less than the width of a central portion of the groove, wherein said C-shaped grooves are substantially filled with electrically conductive polymer material mechanically locked in place** and wherein the one or more C-shaped grooves allow for continued exposure of the conductive polymer to the filament surface as the **monofilament wears so that the filament retains its conductivity**.

Accordingly, claim 1 recites an industrial belt used in making nonwoven textiles by airlaid, meltblown and spunbond processes. Similarly, claim 24 recites an industrial belt polymeric filament. In particular, claim 24 recites "an industrial belt polymeric filament with

electrically conductive polymer material mechanically locked in place and wherein the one or more C-shaped grooves allow for continued exposure of the conductive polymer to the filament surface as the monofilament wears so that the filament retains its conductivity." On the contrary, Takagi relates to garment fabrics for use in dust proof clothes. Such fabrics are <u>not</u> capable of being used as industrial belts merely because they are "garment fabrics" and not industrial belts.

Industrial belts used in making nonwoven textiles by airlaid, meltblown and spunbond processes typically use yarns having a diameter of 0.50mm or more (evidenced by page 3 of Exhibit I), and the linear density of such yarns is 2444 denier or higher (see conversion on page 358 of Exhibit II). The reason why yarns of such large diameter are used in industrial belts is because they are able to withstand the tension and load experienced by industrial belts, for example when used in processes such as airlaid, meltblown and spunbonding process. Industrial belts such as the claimed belt are often subject to high stresses due to applied tension (required to prevent slippage of the conveyor belt on the machine drive rolls), stretching, heavy loads conveyed by the belt, high speed movement combined with side to side movement induced by guiding systems or off-tracking problems, and thermal extremes or thermal shocks. The breaking load of even a 0.50mm diameter industrial yarn is around 10.41daN (see page 202 of Exhibit II), which is equivalent to 23.40lb-force, and an industrial belt formed using such industrial yarns has a breaking strength that measures tens of hundreds of lb-force, and operate under tensions of 20-50pli (pounds per linear inch) of the belt. Takagi, which uses fibers having a linear density of 200 denier or less, simply **cannot** be used in such environments. In other words, Takagi's fibers are **not** suitable for the above-claimed belt.

For the reasons given above, Takagi's garment fabrics **cannot be used as an industrial belt, especially in an airlaid, meltblown or spunbonding process**. At page 14 of the Final

Office Action, the Examiner proffers three rationales as justification for dismissing Appellants' evidence on this point. The Examiner's dismissal is improper, for the reasons that follow.

First the Examiner states that it is not clear that the Exhibit I is drawn to an industrial belt (fabric). The Exhibit explains that the belts disclosed in the Exhibit are for use on Reicofil machines. See pages 1, 4, 6, and 8-10. Appellants also directed the Examiner's attention to www.reicofil.com, where the machines used for its spunbonding and meltblown lines are shown. Exemplary pages printed out from this website are attached as Exhibit III. A cursory review of the website and the machines therein suffice to demonstrate that the Exhibit I refers to an industrial fabric.

Second, the Examiner alleges Exhibits I and II are not sufficient evidence because they are drawn to PET, polyester, and nylon, instead of "the broad range of materials covered by the claim." The Examiner has incorrectly shifted the burden of proof, and more to the point, does not answer the evidence. The material Takagi uses to exemplify its single fibers of 10-220 denier, and preferably 10-100 denier, is polyester, and polymide (nylon 6, nylon 66, etc.). See Col. 3, line 69 to Col. 4, line 7; Col 4 lines 27-30 to Takagi. **The Exhibits clearly show that Takagi's yarns are utterly inappropriate for the claimed industrial belts. In particular the evidence shows, as the Office Action acknowledges, that polyester and nylon – the very yarns Takagi disclose – must be of far greater strength and have far greater diameter and linear density to meet the requirements for the claimed industrial fabrics.** The Office Action has not provided any art or evidence that discloses or otherwise suggests that **Takagi's yarn** with a 200 denier or less can serve to produce an industrial belt, whereas Appellants have explained and **provided evidence** that the yarns of the art of record cannot. Thus Appellants'

have met any evidentiary burdens it may have had, which remain unrebutted, which demonstrates that Takagi fails to disclose any yarn usable in an industrial fabric.

Lastly, the Examiner asserts that Appellants have not shown that all industrial fabric fibers must have denier greater than 200 denier. Appellants did not argue that all industrial fabric fibers must have a denier of 200 denier or greater, but those used in an industrial fabric used in making nonwoven textiles in the airlaid, meltblown or spunbonding processes must. As Appellants have already amply explained and evidenced, fibers of 200 denier or less cannot withstand the stresses from applied tension, stretching, heavy loads, high speed and side-to-side movement, and thermal extremes and shocks attending the claimed processes.

As to Rohrbach, it is directed to a nonwoven filter media designed to entrap particles without adhesive. *Rohrbach*, Abstract. As recited in independent claims 1 and 24, the claims recite polymeric filaments and the industrial belts constructed therefrom, wherein the polymeric filaments comprise, *inter alia*, "one or more C-shaped grooves with a mouth having a width less than the width of the central portion of the groove" wherein an electrically conductive polymer substantially fills the C-shaped grooves, "and wherein the one or more C-shaped grooves **allow for continued exposure of the conductive polymer to the filament surface as the monofilament wears so that the filament retains its conductivity**." (Emphasis added). Claim 24 further recites that "**said C-shaped grooves are substantially filled with electrically conductive polymer material mechanically locked in place.**" Substantially filling the C-shaped grooves with the electrically conductive polymer allows continued exposure of the highly conductive polymer to the surface of the fabric even as the monofilament wears while also shielding and protecting the conductive polymer material. *Instant Application*, page 6, lines 4-12.

On page 4 of the Final Office Action the Examiner asserts that the configuration taught by Rohrbach "inherently" allows for continued exposure of the conductive polymer to the filament surface as the monofilament wears so that the filament retains its conductivity. Applicants respectfully disagree. First, Rohrbach is directed to fibers for use in nonwoven filter media having cavities that entrap powdered activated carbon adsorbent particles. *See Rohrbach*, col. 1, lines 45-63. To form the filter media of Rohrbach, solid particles are aggressively rubbed into the individual fibers. The procedure used to accomplish this dry impregnation is to take the fibers and liberally dust them with the adsorbent powder. The powder particles are rolled into the fiber several times. The powder particles which remain within the cavities of the fibers are surprisingly stable and resistant to physical action. *See id.* at col. 3, lines 38.

Rohrbach further discloses that they do not know the exact reason why the particles remain within the cavities, but they believe it is a keystone type mechanical entrapment effect where the particles seem to engage each other and do not spill from the cavities through the cavity openings. *See id.* at col. 3, lines 37-42. Lastly, and most importantly, Rohrbach states, "[w]e tried impregnating trilobal fiber in which the outer ends or caps of the lobes 26 were removed. Very little carbon particles were retained by such fibers." *Id.* at col. 3, lines 42-45. Consequently, Applicants assert that if the tops or caps of the T-shaped lobes (indicated in the below drawing, which is an annotated version of Figure 3 from Rohrbach) were to wear, the keystone type mechanical entrapment effect within the cavities would fail, causing the powder particles to spill or fall-out of the cavities.

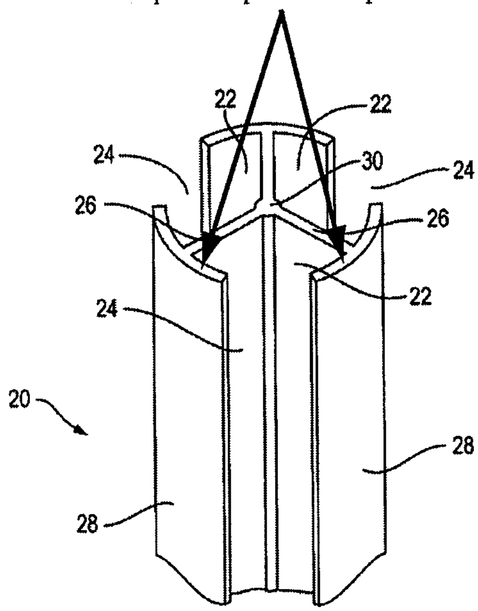

FIG. 3

Therefore, Applicants assert that Rohrbach both fails to disclose and in fact teaches away from a monofilament that allows for continued exposure of the conductive polymer to the filament surface as the monofilament wears so that the filament retains its conductivity. As the Supreme Court said in *KSR International Co. v. Teleflex Inc.* (KSR), 550 U.S. ___, 82 USPQ2d at 1395 (2007) (citing *U.S. v. Adams*, 383 U.S. 39,40): "[W]hen the prior art teaches away from combining certain known elements, discovery of successful means of combining them is more likely to be non-obvious." In addition, a "'reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant.'" *Id.* at 1350 (quoting *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)).

This case presents a textbook example of a reference teaching away from the result sought by the applicant. As discussed above, the claimed invention is advantageous in that the monofilaments and hence the fabric, remain electrically conductive as the monofilaments wear because of continued exposure of the conductive polymer to the monofilament surface.

Therefore the skilled artisan confronted with the problem articulated by the Applicant, namely the need for a highly durable electrically conductive industrial belt, would clearly have been led away from the approach taken by Applicants after having read the Rohrbach reference because, as previously discussed, as the Rohrbach fiber wears, the powder particles entrapped within the cavities would spill out, resulting in a fiber that would not have the same characteristics and properties as a fiber still containing the powder particles.

Consequently, because Rohrbach teaches away from the instant invention and because all of the rejections are based on Rohrbach in combination with Takagi, the § 103 rejections must fail as a matter of law.

Finally, both Takagi and Rohrbach **do not** even remotely relate to industrial belts. Thus neither the Takagi and Rohrbach are **analogous art**, and for this reason alone, the rejection of claim 1 under §103(a) over Takagi in view of Rohrbach must be withdrawn. Following the decision by the Supreme Court of the United States in *KSR International v. Teleflex, Inc.*, 127 S.Ct. 1727, 167 L.Ed2d 705, 82 U.S.P.Q.2d 1365 (2007), the analogous art requirement remains an important part of the primary analysis under *Graham v John Deere Co. of Kansas City*, 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 U.S.P.Q. 459 (1966). As recently re-stated by the Board of Patent Appeals and Interferences:

> The analogous-art test requires the Board to show that a reference is either in the field of the applicant's endeavor or is reasonably pertinent to the problem with which the inventor was concerned in order to rely on that reference as a basis for rejection.

Ex Parte Bartly et al., 2008 WL 275524 (Bd.Pat.App. & Interf. 2008) (Appeal No. 2007-2583).

The Board has further explained that:

> In view of KSR's holding that "any problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the matter claimed"

> [citation omitted] it is clear that the **second part** of the analogous-art test as stated [above] must be expanded to require a determination of **whether the reference**, even though it may be in a different field from that of the inventor's endeavor, is one which, because of the matter with which it deals, **logically** would have commended itself to an artisan's (not necessarily the inventor's) attention in considering **any need or problem** known in the field of endeavor.

Id., at 2008 WL 275525 (emphasis added); and *Ex Parte Morrow*, 2008 WL 1997942 (Appeal No. 2007-3972, which further states that "although under *KSR* it is not always necessary to identify a known need or problem as a motivation for modifying or combining the prior art, it is nevertheless **always necessary** that the prior art relied on to prove obviousness be **analogous.**") (Emphasis added).

See also, *Ex Parte Kurt*, 2007 WL 4470067 (Bd. Pat. App. & Interf., 2007) (Appeal No. 2007-4172) in which an obviousness rejection was reversed because the cited prior art, directed to extreme UV radiation optical elements, was found to be non-analogous to the claims at issue, which were directed to photolithographic projection. As stated by the Board in *Ex Parte Kurt*, "in the present case, even one looking outside Appellant's field of endeavor would not look to Morshita's Mo-Cr metal mold material to cure the deficiencies of Shiraishi's lithographic optical system" (*Id.*, 2007 WL at 4470069).

In the present case, the claim 1 recites: "**[a]n industrial belt used in making nonwoven textiles in the airlaid, meltblown or spunbonding processes** comprising a conductive engineered fabric .... **having static dissipation properties comparable to metal-based fabrics whilst being resistant to dents and creases.**" Claim 24 recites "C-shaped grooves are substantially filled with **electrically conductive polymer material mechanically locked in place** ...[where] **the monofilament wears so that the filament retains its conductivity**." There is no need or problem known in the field of such papermaking machines that requires

making the industrial belts dustproof, which is the reason for Takegi's antistatic clothes. Moreover, the claim expressly recites that the belt be resistant to dents and creases; whereas denting and creasing are necessary and desirable properties in clothing (e.g., to allow mobility). Quite simply, and ordinarily skilled artisan would not look to garment fabrics to solve problems of industrial belts.

Yet even assuming *arguendo* that an artisan would to look to Takegi, an ordinarily skilled artisan would not look to Rohrbach's filtering fabric designed to entrap particles in order to cure Takegi's deficiencies. Indeed, given that Takegi teaches making clothes dustproof, whereas Rohrbach teaches designing filters to entrap particles without adhesive (see *Rohrbach*, abstract, column 1, lines 45-50), an ordinarily skilled artisan would not combine the two to create either a filter that repels dust or dust-free clothing that traps particles. It follows that neither reference combines or logically commends itself to an artisans attention to disclose, much less render obvious, "**[a]n industrial belt used in making nonwoven textiles in the airlaid, meltblown or spunbonding processes** comprising a conductive engineered fabric .... **having static dissipation properties comparable to metal-based fabrics whilst being resistant to dents and creases,** " as claimed in claim 1 or a monofilament with "C-shaped grooves are substantially filled with **electrically conductive polymer material mechanically locked in place** ...[where] **the monofilament wears so that the filament retains its conductivity**" as claimed in claim 24.

Applicants submit therefore, that even under the post-*KSR* analysis of analogous-art, both the Takegi and Rohrbach references fail to qualify as analogous art with each other, much less with the presently claimed invention. Specifically, Takagi and Rohrbach are directed to a garment and hollow fibers for use in nonwoven filter media respectively, and **not** to an industrial

belt as recited in the above-recited claims. Applicants thus respectfully submit that the ground of rejection in the Office Action over these references must be withdrawn.

For at least the foregoing reasons, Applicants respectfully submit that independent claims 1 and 24 are patentable over the relied upon portions of Takagi and Rohrbach, considered either alone or in combination, and is therefore allowable.

b. Claims 1 and 24 are patentable and non-obvious over Takagi in view of Rohrbach and further in view of Sillaots

Claims 1-4, 7-8, 11-14, 16-17, 19-20, 22, 24, 27, 28, 31-34, 36, 37, 39-40 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Takagi in view of Rohrbach and further in view of U.S. Patent No. 3,842,465 to Sillaots et al. ("Sillaots").

As regards claims 1 and 24, Appellants have shown the deficiencies of Takagi in view of Rohrbach above, and Sillaots fails to cure these deficiencies.

Sillaots relates to an apparatus for forming a fibrous lap from webs, including a conveyor to deliver the webs, and a mechanism to lay the webs onto a conveyer withdrawing the ready lap. From Sillaots' disclosure it is clear that it is directed to an apparatus for use in a process such as carding, specifically as **a cross-lapping machine**. A person of ordinary skill in the art well recognizes the fact that a cross-lapping machine is not used in airlaid, meltblown or spunbonding processes recited in the claim 1. As regards these processes, there was an immediate need for an engineered fabric that could dissipate static charge that is developed between the fibers of the fibrous web when they are being "formed" on the industrial belt. Sillaots' belt merely transports a nonwoven web in a certain fashion, after the web is already formed. There is no need for "static dissipation" in Sillaots. Thus an ordinarily skilled artisan would not turn to the disclosures in Sillaots for solutions relating to airlaid, meltblown or spunbonding processes, including "**[a]n industrial belt used in making nonwoven textiles in the airlaid, meltblown**

or spunbonding processes comprising a conductive engineered fabric .... **having static dissipation properties comparable to metal-based fabrics whilst being resistant to dents and creases,** " as claimed in claim 1 or a monofilament with "C-shaped grooves are substantially filled with **electrically conductive polymer material mechanically locked in place** ...[where] **the monofilament wears so that the filament retains its conductivity**" as claimed in claim 24.

Moreover, it is well known that belts used in airlaid, meltblown or spunbonding processes **must be permeable** to function. On page 15 of the Office Action, the Examiner contends that the Applicants have failed to show, or attempt to show, that all fabrics used in said processes must be permeable to function properly.

Firstly, prior art coated designs have suffered from a lack of durability and also interfere with the permeability of open mesh structures. See *Instant Application*, paragraph [0004]. Secondly, industrial belts used in making nonwoven textiles by airlaid, meltblown and spunbond processes have to have air permeability (See page 3 of Exhibit I) or else the belt is rendered useless due to inoperability in a nonwoven forming environment.

The Examiner cited the *KSR vs. Teleflex* to suggest that if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. However, the claimed industrial belt and Sillaots' conveyor belt are not similar insofar as conveyer belts used on cross-lapping machines are impermeable and coated, while the claimed belt is not. Again, belts used in airlaid, meltblown or spunbonding processes **must be permeable** to function.

The Examiner dismisses Appellants' arguments showing that Sillaots teaches a cross-lapping machine, which (a) is not used in airlaid, meltblown or spunbonding process and (b)

teaches impermeable coated belts. At page 15 of the Final Office Action, the Examiner repeats that "it is known in the nonwoven making belt art to use antistatic plastics." Appellants' arguments of record directly address this allegation: Sillaots does not teach the claimed anti-static properties and configuration, as there is no need for static dissipation between fibers of the web on a belt and the belt itself.

Applicants evidence the foregoing arguments using the following websites, which clearly show the purpose or use of a cross-lapping machine in the industry.

www.habasit.com for types of belts use in this industry and their differences (Exemplary pages attached as Exhibit IV);

www.dilo.de for devices used in cross-lapping and diagrams depicting cross-lapping machines (Exemplary pages attached as Exhibit V), and

www.ramcon-fiberlok.com for a video showing a cross-lapper belt in motion (Exemplary pages attached as Exhibit VI).

Applicants submit that conveyor belts used on such devices are **impermeable and coated**. However, it is well known that belts used in airlaid, meltblown or spunbonding processes **must be permeable**, as discussed above. Accordingly, one skilled in the art would not look to the belt of Sillaots for applications involving the present invention.

As explained above, industrial fabrics belts used in making nonwoven textiles by airlaid meltblown, and spunbond processes must have, *inter alia*, air permeability (see page 3 of Exhibit 1), or else the belt would not function for its intended use. The Office Action disagrees at page 15 of the Final Office Action, alleging that "applicant asserts the claimed industrial belt...must be impermeable to liquids," and that the "current specification does not even mention a belt used in a wet application," and that "the specification only mentions a belt used in a dry application."

The Examiner wholly misinterprets the Appellants' arguments. **Appellants make no reference to wet processes or liquid permeability whatsoever.** As Appellants stated at, inter alia, page 13 of the April response, "**industrial belts used in making nonwoven textiles by airlaid, meltblown and spunbond processes have to have air permeability (See page 3 of Exhibit I) or else the belt is rendered useless due to inoperability in a nonwoven forming environment.**" Emphasis added. As an ordinarily skilled artisan understands, industrial belts used in making airlaid, meltblown and spunbond processes must be **permeable to air.** Accordingly, and as Applicants have amply evidenced, the recitation of a fabric for "making nonwoven textiles in the airlaid, meltblown or spunbonding processes" clearly conveys a structural characteristic such as air permeability, which is necessary for such a fabric, to an ordinarily skilled artisan. Hence the recitation cannot be dismissed as an intended use in view of the structure that the recitation conveys to an ordinarily skilled artisan. See M.P.E.P. §2173.05(g).

Finally, merely because Sillaots discloses that the belt used on the cross-lapping machine requires having physical and mechanical properties such as use of antistatic plastic to make the belt, one of ordinary skill in the art would not be motivated to modify Takagi, which relates to garment fabrics, nor Rohrbach, which relates to a filter. For the reasons amply laid out above, these references, among other things, are wholly non-analogous to each other and to industrial belts.

For at least the foregoing reasons, Applicants respectfully submit that independent claims 1 and 24 patentably distinguish over Takagi, Rohrbach and Silloats, considered either alone or in combination, because the relied upon portions of the cited references fail to teach each and every limitation of claims 1 and 24 or evidence any reason, either in the references or in the knowledge

of an ordinarily skilled artisan, to modify or combine the references to practice the claimed invention.

c. Claims 1 and 24 are patentable and non-obvious over Takagi in view of Rohrbach and further in view of Sillaots or Alex

Claims 1-4, 7-8, 11-14, 16-17, 19-20, 22-24, 27-28, 31-34, 36-37 and 39-40 are rejected under 35 U.S.C. 103(a) over Takagi in view of Rohrbach and Sillaots or Alex. With respect to claims 1 and 24, the deficiencies of Takagi, Rohrbach, and Sillaots are amply discussed above. Alex does nothing to cure these deficiencies as it simply discloses antistatic power transmission belts and conveyor belts.

Therefore, the § 103(a) rejections in the Office Action should be reconsidered and withdrawn, and such relief is respectfully requested.

III. DEPENDENT CLAIMS

Claims 9-10, 23, 29-30 and 38 were rejected under 35 U.S.C. §103(a) over Takagi in view of Rohrbach and further in view of U.S. Patent No. 4,803,096 to Kuhn. Claims 9-10, 23, 29-30, and 38 are rejected under 35 U.S.C. 103(a) over Takagi in view of Rohrbach and Sillaots or Alex and further in view of Kuhn. Claims 2-4, 7-8, 11-14, 16-17, 19-20, 22-23, 27-28, 31-34, 36-37 and 39-40 each depend from independent claims 1 and 24, discussed above, and are therefore patentable for at least the same reasons. Nothing in the cited art of record cures the deficiencies of the art as applied to independent claims 1 and 24. Thus dependent claims 2-4, 7-8, 11-14, 16-17, 19-20, 22-23, 27-28, 31-34, 36-37 and 39-40 stand or fall with independent claims 1 and 24.

CONCLUSION

For the reasons discussed above, claims 1-21 are patentable. It is, therefore, respectfully submitted that the Examiner erred in rejecting claims 1-21, and Appellants request a reversal of these rejections by this Honorable Board. As a result, the allowance of this application should be mandated.

Respectfully submitted,

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APPENDIX I

CLAIMS ON APPEAL

What is claimed is:

1. (Previously Presented) An industrial belt used in making nonwoven textiles in the airlaid, meltblown or spunbonding processes comprising a conductive engineered fabric comprising a plurality of polymeric filaments having one or more C-shaped grooves with a mouth having a width less than the width of a central portion of the groove formed therein, wherein each filament includes electrically conductive polymer material incorporated as either a blend or a coating that substantially fills the C-shaped grooves, said conductive fabric having static dissipation properties comparable to metal-based fabrics whilst being resistant to dents and creases and wherein the one or more C-shaped grooves allow for continued exposure of the conductive polymer to the filament surface as the monofilament wears so that the filament retains its conductivity.

2. (Previously Presented) The industrial belt in accordance with claim 1, wherein the functional filaments constitute between five and one hundred percent of the fabric.

3. (Previously Presented) The industrial belt in accordance with claim 1, wherein the fabric has static dissipation properties equivalent to metal-based fabrics whilst also having physical properties comparable to non-conductive synthetic fabrics.

4. (Previously Presented) The industrial belt in accordance with claim 3, wherein said physical properties include one of modulus, tenacity, strength, adhesion, abrasion resistance, and durability.

5. (Withdrawn) The fabric in accordance with claim 1, wherein the filament comprises conductive polymer material blended with polymeric materials that can be oriented.

6. (Withdrawn) The fabric in accordance with claim 1, wherein the filament is a bicomponent fiber containing conductive polymer material and formed by melt extrusion.

7. (Previously Presented) The industrial belt in accordance with claim 1, wherein the filament comprises an oriented structure coated with conductive polymer material.

8. (Previously Presented) The industrial belt in accordance with claim 7, wherein the conductive polymer is applied by one of dip coating, spraying from solutions, dispersion over the filament, and thermal spraying.

9. (Previously Presented) The industrial belt in accordance with claim 1, wherein the filament comprises one hundred percent conductive polymer material selected from the class of polyanilines.

10. (Previously Presented) The industrial belt in accordance with claim 9, wherein said polyaniline filament has physical properties comparable to a polyamide filament.

11. (Previously Presented) The industrial belt in accordance with claim 1, wherein the filament is a lobed monofilament coated with conductive polymer material.

12. (Previously Presented) The industrial belt in accordance with claim 11, wherein the coating has a conductivity, minimally greater than 10^{-3} S/cm, whilst maintaining the physical and tribological properties of the core monofilament.

13. (Previously Presented) The industrial belt in accordance with claim 11, wherein the shape of the one or more C-shaped grooves provide a mechanical interlock between the monofilament and the conductive polymer filling the grooves.

14. (Previously Presented) The industrial belt in accordance with claim 13, wherein the interlock reduces a need for adhesion of the conductive polymer to the monofilament.

15. (Canceled).

16. (Previously Presented) The industrial belt in accordance with claim 13, wherein positioning of the conductive polymer in the C-shaped grooves shields the polymer and reduces the impact of its lesser abrasion resistance and physical properties.

17. (Previously Presented) The industrial belt in accordance with claim 11, wherein the weight composition of the conductive material is ten percent or less of the total weight of the coated monofilament.

18. (Canceled).

19. (Previously Presented) The industrial belt in accordance with claim 1, wherein the fabric is single layered , multi layered, or laminated.

20. (Previously Presented) The industrial belt in accordance with claim 1, wherein the fabric is one of woven, nonwoven, spiral-link, MD or CD yarn arrays, knitted fabric, extruded mesh, and spiral wound strips of woven and nonwoven materials comprising yarns including monofilaments, plied monofilaments, multifilaments, plied multifilaments and staple fibers.

21. (Canceled).

22. (Previously Presented) The industrial belt in accordance with claim 1, wherein the fabric is used in a dry application in which static dissipation is required through a belting media.

23. (Previously Presented) The industrial belt in accordance with claim 1, wherein the conductive polymer is one of polyacetylene (PA), polythiophene (PT), poly3alkyl-thiophene)

(P3AT), polypyrrole (Ppy), poly-isothianaphthene (PITN), poly(ethylene dioxythiophene (PEDOT), alkoxy-substituted poly(para-phenylene vinylene) (PPV), poly(para-phenylene vinylene) (PPV), poly(2,5-dialkoxy-para-phenylene), poly(paraphenylene) (PPP), ladder-type poly(para-phenylene) (LPPP), poly(para-phenylene) sulfide (PPS), polyheptadiyne(PHT), and poly(3-hexyl thiophene) (P3HT).

24. (Previously Presented) An industrial belt polymeric filament said polymeric filament having one or more C-shaped grooves with a mouth having a width less than the width of a central portion of the groove, wherein said C-shaped grooves are substantially filled with electrically conductive polymer material mechanically locked in place and wherein the one or more C-shaped grooves allow for continued exposure of the conductive polymer to the filament surface as the monofilament wears so that the filament retains its conductivity.

25. (Withdrawn) The filament in accordance with claim 24, wherein the filament comprises conductive polymer material blended with polymeric materials that can be oriented.

26. (Withdrawn) The filament in accordance with claim 24, wherein the filament is a bicomponent fiber containing conductive polymer material and formed by melt extrusion.

27. (Original) The filament in accordance with claim 24, wherein the filament comprises an oriented structure coated with conductive polymer material.

28. (Original) The filament in accordance with claim 27, wherein the conductive polymer is applied by one of dip coating, spraying from solutions, dispersion over the filament, and thermal spraying.

29. (Original) The filament in accordance with claim 24, wherein the filament comprises one hundred percent conductive polymer material selected from the class of polyanilines.

30. (Original) The filament in accordance with claim 29, wherein said polyaniline filament has physical properties comparable to a polyamide filament.

31. (Original) The filament in accordance with claim 24, wherein the filament is a lobed monofilament coated with conductive polymer material.

32. (Previously Presented) The filament in accordance with claim 31, wherein the coating has a conductivity, minimally greater than 10^{-3} S/cm, whilst maintaining the physical and tribological properties of the core monofilament.

33. (Previously Presented) The filament in accordance with claim 31, wherein the shape of the C-shaped grooves provide a mechanical interlock between the monofilament and the conductive polymer filling the grooves.

34. (Original) The filament in accordance with claim 33, wherein the interlock reduces a need for adhesion of the conductive polymer to the monofilament.

35. (Canceled).

36. (Previously Presented) The filament in accordance with claim 33, wherein positioning of the conductive polymer in the C-shaped grooves shields the polymer and reduces the impact of its lesser abrasion resistance and physical properties.

37. (Original) The filament in accordance with claim 31, wherein the weight composition of the conductive material is ten percent or less of the total weight of the coated monofilament.

38. (Original) The filament in accordance with claim 24, wherein the conductive polymer is one of polyacetylene (PA), polythiophene (PT), poly3alkyl-thiophene) (P3AT), polypyrrole (Ppy), poly-isothia-naphthene (PITN), poly(ethylene dioxythiophene (PEDOT), alkoxy-substituted poly(para-phenylene vinylene) (PPV), poly(para-phenylene vinylene) (PPV), poly(2,5-dialkoxy-para-phenylene), poly(para-phenylene) (PPP), ladder-type poly(para-phenylene) (LPPP), poly(para-phenylene) sulfide (PPS), polyheptadiyne(PHT), and poly(3-hexyl thiophene) (P3HT).

39. (Previously Presented) The industrial belt in accordance with claim 11, wherein the coating has a conductivity greater than 10^3 S/cm, whilst maintaining the physical and tribological properties of the core monofilament.

40. (Previously Presented) The filament in accordance with claim 31, wherein the coating has a conductivity greater than 10^3 S/cm, whilst maintaining the physical and tribological properties of the core monofilament.

APPENDIX II

EVIDENCE

EXHIBIT I

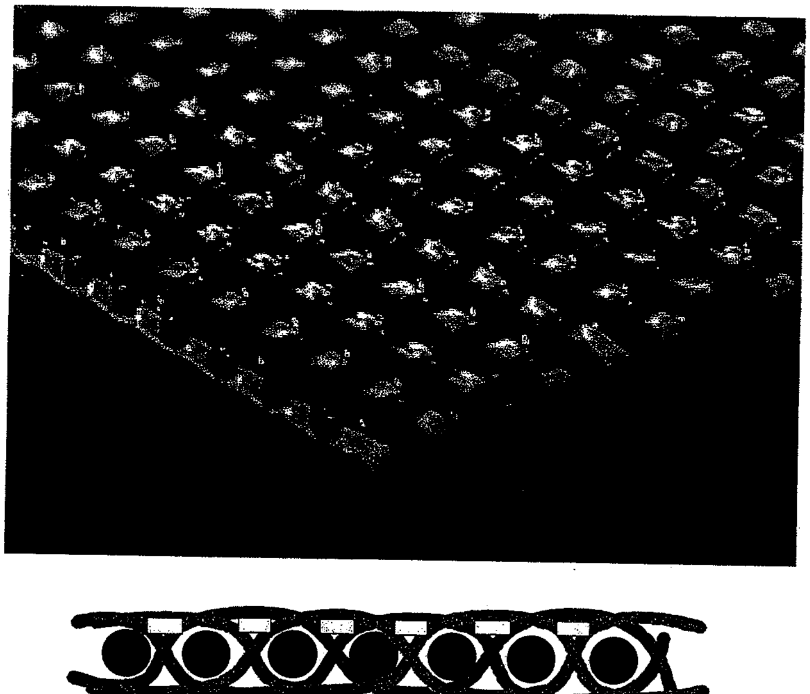
EXHIBIT I

NEOSTAT 2001

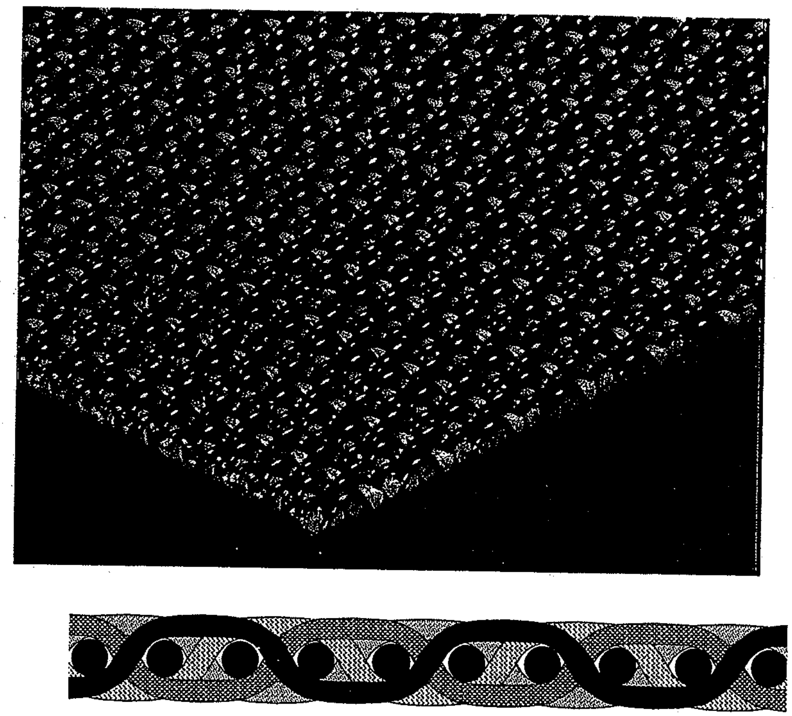
The new solution for your Reicofil line ...

COFPA

NEOSTAT 2001



Neostat design



Velostat 170 PC 500 design

COFPA

NEOSTAT 2001

Neostat 2001 versus Velostat 170PC 500

Design	Air Permeability (CFM)	MD Yarns	CMD Yarns
Neostat 2001	550	0.5 mm PET and conductive yarns	Flat yarn close to the product in order to increase fiber retention and big yarn on machine side
Velostat 170PC 500	500	0.5 mm PET and conductive yarns	Big yarn in cross machine direction

COFPA

NEOSTAT 2001

- ***NEOSTAT*** is the result of a 2 years joint development between Cofpa and Reifenhäuser.
  - Objective : this new patented design should solve at the same time operating problems on the last generation of Reicofil machines such as : fiber penetration, cleanliness, web release. This goal needs to be achieved with a durable and stable fabric design.

COFPA

NEOSTAT 2001

- Main benefits:
  - Improved fiber support
  - Better formation
  - Easy to clean
  - Mechanical stability and resistance
  - Quick start-up

COFPA

NEOSTAT 2001

- Improved fiber support thanks to belt design :
  - Vacuum boxes stay cleaner for longer periods - less machine shut-downs
  - Good web release

COFPA

NEOSTAT 2001

- Better formation :
  - By keeping vacuum boxes clean, uniformity of formation is guaranteed over longer periods of time.

COFPA

NEOSTAT 2001

- Easy to clean :
  - A single layer design as *Neostat* with higher fiber support thanks to flat yarn closed to the top. This allows polymer drops to stay on surface and to be easily removed
  - Multi layer designs with higher yarns density have shown good fibers retention. In this case fibers are trapped inside the fabric and are more difficult to clean.

COFPA

NEOSTAT 2001

- Mechanical strength :
  - By using thick monofilaments, *Neostat* design retains a high mechanical strength :
    - reduced risk of damage during production
    - supports shock wash (high-pressure, high temperature) and removal of polymer drips with scraper

COFPA

NEOSTAT 2001

⌘Quick start-up :

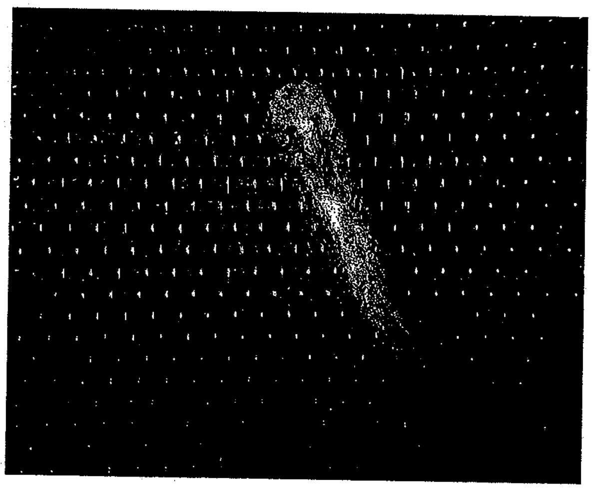
- No grinding or other startup procedure is necessary. Full production speed can be reached immediately after installation of a new fabric. This will bring you value by increasing throughput.

NEOSTAT 2001

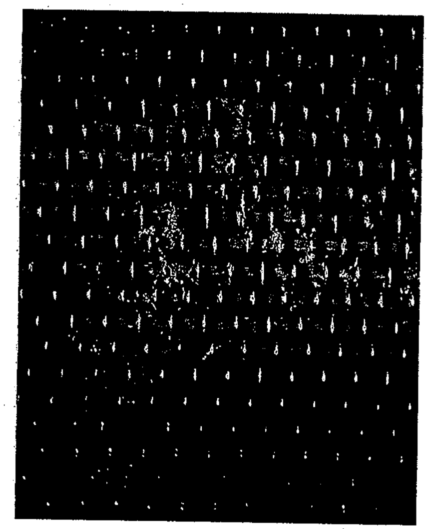
- Neostat design is tested and used on:
  - Reicofil 3 MF, SSMMS: producing SSS and SSMMS :
  - Reicofil 4: producing SS, SSS, SMMMS

COFPA

NEOSTAT 2001



Polymer drip on ***NEOSTAT***



After cleaning with scraper only

⌘ Polymer drops are not embedded in the fabric and are easier to remove

COFPA

EXHIBIT II

EXHIBIT II

Asten

PAPER MACHINE CLOTHING

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TABLE 4.2. Properties of Polyester Dryer Yarn Material (diameter: 0.5 mm).

	Density (dtex)	Tenacity (cN/tex)	Breaking Load (daN)	Elongation (%)	Free Shrinkage (%) (180°C, 30 min)	Testrite (%) (180°C, 2 min)	Loop Strength	
							daN	%
	2832	36.5	10.33	41.6	4.0	2.7	17.2	82.6
	2835	36.8	10.41	40.6	4.1	2.5	18.21	87.5
	2836	37.2	10.54	43.2	4.0	2.7	15.39	73.9
	2826	37.2	10.54	41.0	4.1	2.6	17.21	82.7
	2829	37.0	10.49	41.1	4.1	2.7	14.52	69.8
	2830	35.9	10.16	37.4	4.1	2.6	16.80	80.7
	2833	36.8	10.41	41.7	3.9	2.6	15.75	75.7
	2832	36.9	10.45	41.8	4.0	2.6	18.61	89.4
	2830	36.4	10.32	43.0	3.9	2.6	15.31	73.6
	2837	36.8	10.41	41.5	4.0	2.5	16.54	79.5
Average	2832	36.7	10.41	41.3	4.0	2.6	16.55	79.5
Minimum	2826	35.9	10.16	37.4	3.9	2.5	14.52	69.8
Maximum	2837	37.2	10.54	43.2	4.1	2.7	18.61	89.4
s	3.2	0.4	0.12	1.6	0.1	0.04	1.32	
v	0.1%	1.1%	1.1%	3.8%	1.9%	1.5%	7.9%	
Certificate		36.8		39.2	3.0			
Product tolerance:	2750 ± 150	36.0 ± 4.0	10.2 (9.5–11)	41.0 ± 6.0	3.5 ± 1.0	2.5 ± 1.0		

POLYESTER MONOFILAMENT SIZE EQUIVALENCY CHART

Diameter Thousandths of an Inch (mil.)	Diameter Millimeters	Denier	Decitex	Yards/lb.	Meters/Kg.
.0039	.10	95	106	45,591	93,881
.004	.1016	100	112	44,289	89,243
.0043	.11	116	129	38,327	77,230
.0047	.12	139	154	32,078	64,638
.005	.1270	157	175	28,345	57,115
.0051	.13	183	182	27,245	54,899
.0055	.14	190	211	23,425	47,201
.0059	.15	219	243	20,357	41,020
.006	.1524	226	252	19,684	39,863
.0063	.16	250	277	17,854	35,977
.0067	.17	282	314	15,786	31,809
.007	.1788	308	343	14,481	29,140
.0071	.18	317	352	14,057	28,325
.0075	.19	354	393	12,598	25,385
.0079	.20	393	436	11,354	22,879
.006	.2032	403	448	11,072	22,310
.0083	.21	434	482	10,286	20,727
.0087	.22	476	529	9,362	18,865
.009	.2286	510	567	8,748	17,628
.0091	.23	521	579	8,557	17,243
.0094	.24	558	618	8,020	16,160
.0098	.25	605	672	7,378	14,867
.010	.2540	630	700	7,068	14,278
.0102	.26	655	726	6,811	13,724
.0106	.27	.707	786	6,306	12,708
.011	.28	785	850	5,832	11,751
.0114	.29	818	909	5,452	10,987
.0118	.30	877	974	5,089	10,254
.012	.3048	907	1,008	4,921	9,915
.0122	.31	937	1,041	4,761	9,593
.0126	.32	1,000	1,111	4,463	8,994
.013	.33	1,064	1,183	4,193	8,449
.0134	.34	1,131	1,256	3,946	7,952
.0138	.35	1,199	1,333	3,721	7,497
.014	.3556	1,234	1,372	3,615	7,285
.0142	.36	1,270	1,411	3,514	7,061
.0146	.37	1,342	1,492	3,324	6,898
.015	.38	1,417	1,575	3,149	6,346
.0154	.39	1,494	1,660	2,988	6,020
.0157	.40	1,552	1,725	2,874	5,792
.016	.4064	1,612	1,792	2,768	5,577
.0161	.41	1,633	1,814	2,733	5,508
.0165	.42	1,715	1,905	2,802	5,244
.0169	.43	1,799	1,999	2,481	4,999
.017	.4318	1,820	2,023	2,452	4,940
.0173	.44	1,885	2,095	2,367	4,770
.0177	.45	1,973	2,193	2,261	4,557
.018	.4572	2,041	2,268	2,187	4,407
.0181	.48	2,063	2,293	2,163	4,358
.0185	.47	2,156	2,395	2,070	4,172
.0189	.48	2,250	2,500	1,983	3,997
.019	.4826	2,274	2,527	1,962	3,955
.0193	.49	2,346	2,607	1,902	3,833
.0197	.50	2,444	2,716	1,825	3,676

POLYESTER MONOFILAMENT SIZE EQUIVALENCY CHART

Diameter Thousandths of an Inch (mil.)	Diameter Millimeters	Denier	Decitex	Yards/lb.	Meters/Kg.
.020	.5080	2,520	2,800	1,771	3,587
.0201	.51	2,545	2,828	1,754	3,534
.0205	.52	2,647	2,941	1,688	3,397
.0209	.53	2,751	3,057	1,622	3,268
.021	.5334	2,778	3,087	1,606	3,237
.0213	.54	2,858	3,175	1,561	3,147
.0217	.55	2,968	3,298	1,504	3,032
.022	.58	3,060	3,400	1,458	2,939
.0224	.57	3,181	3,512	1,412	2,845
.0228	.58	3,274	3,638	1,383	2,748
.023	.5842	3,332	3,703	1,339	2,699
.0232	.59	3,390	3,787	1,318	2,852
.0238	.60	3,508	3,898	1,272	2,563
.024	.81	3,828	4,032	1,230	2,478
.0244	.82	3,750	4,167	1,190	2,398
.0248	.83	3,874	4,305	1,152	2,321
.025	.8350	3,937	4,375	1,133	2,284
.0252	.64	4,000	4,445	1,115	2,248
.0256	.65	4,128	4,587	1,081	2,178
.028	.86	4,258	4,732	1,048	2,112
.0264	.87	4,390	4,878	1,018	2,048
.0268	.88	4,524	5,027	986	1,988
.027	.6858	4,592	5,103	972	1,958
.0272	.89	4,660	5,178	957	1,929
.0278	.70	4,799	5,332	930	1,874
.028	.71	4,939	5,468	903	1,821
.0283	.72	5,045	5,606	844	1,782
.0287	.73	5,189	5,765	860	1,733
.029	.7368	5,298	5,887	842	1,897
.0291	.74	5,334	5,927	836	1,688
.0295	.75	5,482	6,091	814	1,640
.0299	.76	5,632	6,258	792	1,597
.030	.7620	5,670	6,300	787	1,586
.0303	.77	5,783	6,428	771	1,555
.0307	.78	5,937	6,598	751	1,515
.031	.7874	6,054	6,727	737	1,485
.0311	.79	6,093	6,770	732	1,476
.0315	.80	8,251	8,945	714	1,439
.0319	.81	8,410	7,123	696	1,403
.032	.8128	6,451	7,168	692	1,394
.0323	.82	6,572	7,303	679	1,368
.0326	.63	6,895	7,439	668	1,343
.033	.84	6,880	7,623	650	1,311
.0334	.85	7,028	7,808	635	1,279
.0338	.88	7,197	7,997	620	1,249
.034	.8638	7,262	8,092	613	1,235
.0342	.87	7,388	8,187	605	1,220
.0346	.88	7,542	8,380	591	1,192
.035	.89	7,717	8,575	576	1,165
.0354	.90	7,894	8,772	585	1,139
.0358	.91	8,074	8,971	552	1,114
.036	.9144	8,164	9,072	546	1,101
.0362	.92	8,255	9,173	540	1,089
.0388	.93	8,439	9,376	529	1,065
.037	.94	8,824	9,583	517	1,043
.0374	.95	8,812	9,791	506	1,020
.0377	.96	8,954	9,949	498	1,004
.038	.9652	9,097	10,108	490	988
.0381	.97	9,145	10,181	488	983
.0385	.98	9,338	10,375	478	963
.0389	.99	9,533	10,592	468	943
.039	.9906	9,582	10,648	465	938
.0393	1.00	9,730	10,811	458	924
.0397	1.01	9,929	11,032	449	905
.040	1.0160	10,080	11,200	442	892

NYLON MONOFILAMENT SIZE EQUIVALENCY CHART

Diameter Thousandths of an Inch (mil.)	Diameter Millimeters	Denier	Decitex	Yards/lb.	Meters/Kg.
.004	.1016	83	92	53,658	108,122
.0043	.11	96	106	46,436	93,589
.0047	.12	114	127	38,868	78,319
.005	.1270	130	144	34,341	69,198
.0051	.13	135	.150	33,008	66,512
.0055	.14	157	174	28,381	57,188
.0059	.15	181	201	24,663	49,697
.006	.1524	187	208	23,848	48,054
.0063	.16	206	229	21,632	43,588
.0067	.17	233	259	19,126	38,536
.007	.1778	254	283	17,521	35,305
.0071	.18	262	291	17,031	34,317
.0075	.19	292	325	15,262	30,754
.0079	.20	324	360	13,756	27,719
.008	.2032	332	369	13,414	27,030
.0083	.21	358	398	12,482	25,112
.0087	.22	393	437	11,343	22,856
.009	.2286	421	466	10,599	21,357
.0091	.23	430	478	10,367	20,890
.0094	.24	459	510	9,716	19,576
.0098	.25	499	554	8,939	18,013
.010	.2540	520	577	8,585	17,299
.0102	.26	541	601	8,252	16.628
.0106	.27	584	649	7,641	15,396
.011	.28	629	699	7,095	14,297
.0114	.29	675	750	6,608	13,311
.0118	.30	724	804	6.165	12,424
.012	.3048	748	832	5,962	12,013
.0122	.31	773	659	5,768	11,623
.0126	.32	625	917	5,407	10.696
.013	.33	878	976	5,080	10,236
.0134	.34	933	1,037	4,781	9,634
.0138	.35	990	1,100	4,508	9,084
.014	.3556	1,019	1,132	4,360	8,826
.0142	.36	1,048	1,165	4,257	8,579
.0146	.37	1,108	1,231	4,027	8,115
.015	.38	1,170	1,300	3,815	7,688
.0154	.39	1,233	1,370	3,620	7,294
.0157	.40	1,281	1,424	3,483	7,018
.016	.4064	1,331	1,479	3,353	6,757
.0161	.41	1,347	1,497	3,312	6,673
.0165	.42	1,415	1,573	3,153	6,354
.0169	.43	1,485	1,650	3,005	6,057
.017	.4316	1,502	1,669	2,970	5,985
.0173	.44	1,556	1,729	2,888	5,780
.0177	.45	1,629	1,810	2,740	5,521
.016	.4572	1,684	1,872	2,649	5,339
.0181	.46	1,703	1,892	2,620	5,280
.0185	.47	1,779	1,977	2,508	5,054
.0189	.48	1,857	2,063	2,403	4,642
.019	.4826	1,877	2,065	2,378	4,792
.0193	.49	1,936	2,152	2,304	4,844
.0197	.50	2,018	2,242	2,212	4,457
.020	.5080	2,080	2,311	2.146	4,324
.0201	.51	2,100	2,334	2,125	4,281
.0205	.52	2,165	2,428	2,042	4,116
.0209	.53	2,271	2,523	1,965	3,960

NYLON MONOFILAMENT SIZE EQUIVALENCY CHART

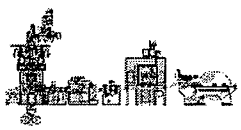
Diameter Thousandths of an Inch (mil.)	Diameter Millimeters	Denier	Decitex	Yards/lb.	Meters/Kg.
.021	.5334	2,293	2,548	1,946	3,922
.0213	.54	2,359	2,621	1,892	3,813
.0217	.55	2,448	2,720	1,823	3,673
.022	.56	2,516	2,796	1,773	3,574
.0224	.57	2,609	2,899	1,711	3,447
.0228	.56	2,703	3,003	1,651	3,327
.023	.5842	2,750	3,056	1,622	3,270
.0232	.59	2,798	3,109	1,595	3,214
.0236	.60	2,896	3,217	1,541	3,106
.024	.61	2,995	3,328	1,490	3,003
.0244	.62	3,095	3,439	1,442	2,905
.0248	.63	3,198	3,553	1,395	2,812
.025	.6350	3,250	3,611	1,373	2,767
.0252	.64	3,302	3,669	1,351	2,724
.0258	.65	3,407	3,786	1,310	2,639
.026	.66	3,515	3,905	1,270	2,559
.0264	.67	3,624	4,026	1,231	2,482
.0268	.68	3,734	4,149	1,195	2,408
.027	.6858	3,790	4,212	1,177	2,373
.0272	.69	3,847	4,274	1,160	2,338
.0276	.70	3,961	4,401	1,127	2,270
.028	.71	4,076	4,529	1,095	2,206
.0283	.72	4,184	4,627	1,071	2,106
.0287	.73	4,283	4,759	1,042	2,100
.029	.7366	4,373	4,859	1,020	2,057
.0291	.74	4,403	4,892	1,013	2,042
.0295	.75	4,525	5,028	988	1,987
.0299	.76	4,648	5,165	960	1,935
.030	.7620	4,680	5,200	953	1,922
.0303	.77	4,774	5,304	935	1,884
.0307	.78	4,900	5,445	910	1,835
.031	.7874	4,997	5,552	893	1,800
.0311	.79	5 029	5,588	887	1,788
.0315	.80	5,159	5,733	865	1,743
.0319	.81	5,291	5,879	843	1,700
.032	.8128	5,324	5,916	838	1,689
.0323	.82	5,425	6,027	822	1,658
.0326	.83	5,526	6,140	807	1,627
.033	.84	5,662	6,292	788	1,588
.0334	.85	5,800	6,445	769	1,550
.0338	.86	5,940	6,600	751	1,514
.034	.8636	6,011	6,679	742	1,498
.0342	.87	6,082	6,757	734	1,479
.0346	.88	6,225	6,916	717	1,445
.035	.89	6,370	7,077	700	1,412
.0354	.90	6,516	7,240	685	1,380
.0358	.91	6,664	7,405	669	1,349
.036	.9144	6,739	7,488	662	1,334
.0362	.92	6,814	7,571	655	1,320
.0366	.93	6,965	7,739	640	1,291
.037	.94	7,118	7,909	627	1,263
.0374	.95	7,273	8,081	613	1,236
.0377	.96	7,390	8,211	604	1,217
.038	.9652	7,508	8,343	594	1,198
.0381	.97	7,548	8,387	591	1,191
.0385	.98	7,707	8,564	579	1,167
.0389	.99	7,868	8,742	567	1,143
.039	.9906	7,909	8,788	564	1,137
.0393	1.00	8,031	8,923	555	1,120
.0397	1.01	8,195	9,106	544	1,097
.040	1.016	8,320	9,244	536	1,081
.045	1.143	10,530	11,700	423	854
.050	1.270	13,000	14,444	343	691
.055	1.397	15,730	17,477	283	571
.060	1.524	18,720	20,800	238	480
.065	1.651	21,970	24,411	203	409
.070	1.778	25,480	28,311	175	353
.075	1.905	29,250	32,500	152	307
.080	3.032	33,280	36,977	134	270

EXHIBIT III

Spunbonding lines

The spunbonding process is the most economic way of making nonwoven materials from a polymer in one step. Endless filaments in combination with a uniform discharge guarantee low grammage whilst retaining strength.

> Process description
> Type overview



Module

A typical spunbonding fabric line - A module-by-module explanation.
> Interactive line demo

Infomaterial to download

REICOFIL - Spunbond and Composite Systems 04/2007 , pdf, 2402 KByte

You require a current Adobe Acrobat Reader to read these documents.
Click here to download this software.

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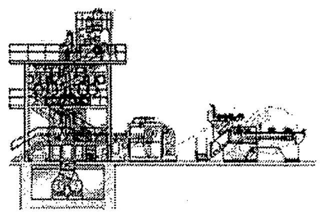
  - Modules
  - Technology
  - Type overview
- MeltBlown lines
- Composite lines
- Areas of application
- R&D cooperation
- Service
- Exhibition & Events
- Press & News
- Company
- Purchasing
- Job & Career
- Contact

Spunbonding lines: Type overview

We apart three different types of spunbonding lines: one, two and three beam systems, differing in working speed and total throughput.

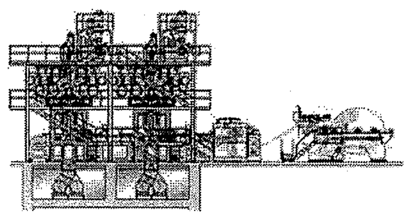
Single beam spundbond line

For production speeds up to 250 m/min



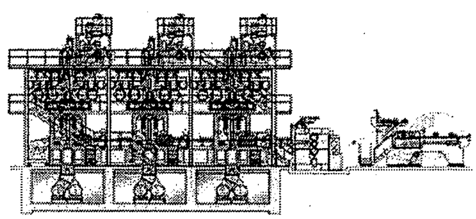
Double beam spunbond line

For production speeds up to 450 m/min



Three beam spunbond line

For production speeds up to 800 m/min



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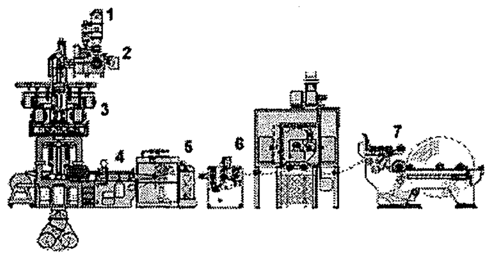
Spunbonding lines: Modules



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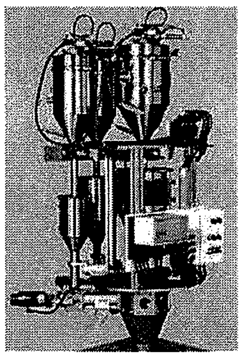
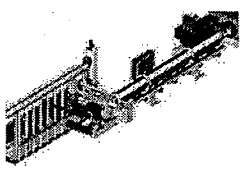
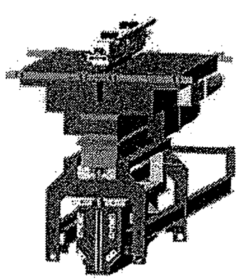
1 Dosing unit



2 Melt preparation

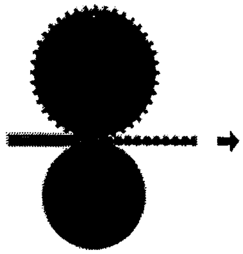


3 Filament production

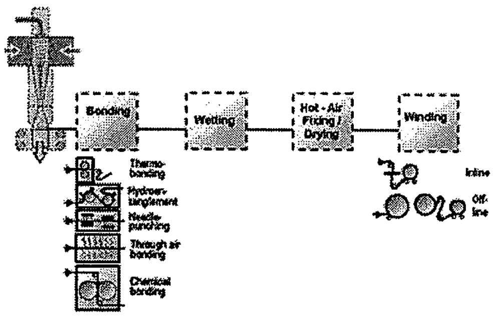


4 Collection and conveyor unit

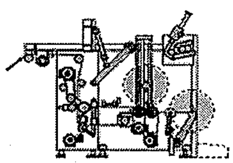
5 Nonwoven bonding

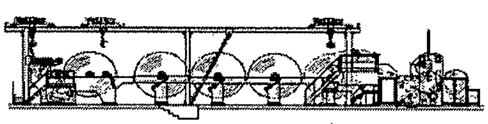


6 Nonwoven equipment

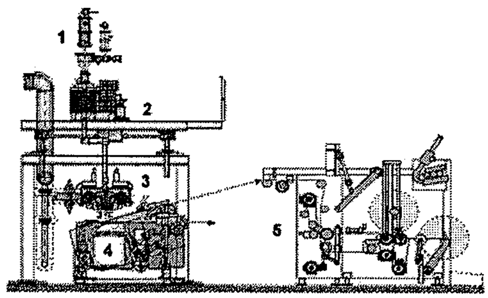


7 Winder





MeltBlown lines: Modules



1 Dosing unit
2 Melt preparation
3 Filament production
4 Collection and conveyor unit
5 Winder

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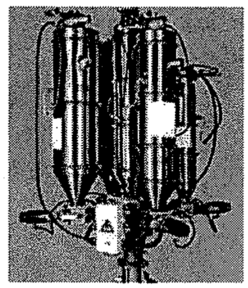
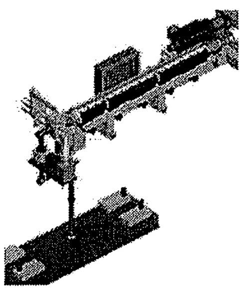
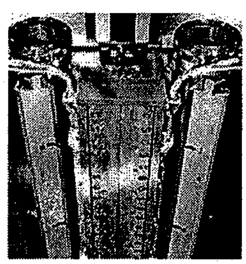
1 Dosing unit



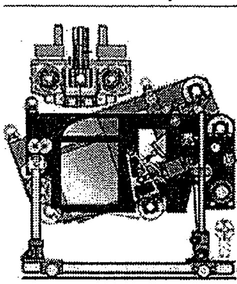
2 Melt preparation



3 Filament production



4 Collection and conveyor unit



5 Winder

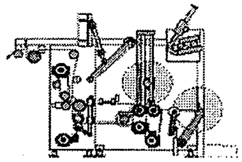


EXHIBIT IV

Nonwoven

Features & benefits   Downloads

Habasit is the leading Crosslapper- and Conveyor belt manufacturer worldwide with a market share of > 50 %.
Habasit Crosslapper belts are known in the market for excellent quality and high reliability and are available up to 4000 mm wide open prepared or endless made.
Leading machine manufacturers in Germany, France, Italy, Japan and Korea selected Habasit Crosslapper belts for the original equipment because of the excellent release properties to the fiber web, short installation and putting into operation and because of the excellent price/value ratio.
On site installation and technical support are provided through 25 Habasit affiliated companies worldwide and more than 50 agents and distributors.

See our process map to find the right machine and corresponding belt then click on the line for information.

Process line   Please select

If you already know which belt you need, have a look at our nonwoven industry Product Data Sheets for more detailed information.

Overview all Conveyor belts

High duty conveyor and processing belts
Habasit's high-duty conveyor belt line with a long track record of success is made up of products for use in specialized applications that involve extreme chemical, mechanical or abrasive conditions. These versatile belts are used primarily in the paper-processing, textile, wood, metal and materials-handling industries.
Overview

Crosslinked polyurethane conveyor and processing belts
These belts offer outstanding chemical resistance in combination with release and abrasion properties.
Overview

Polyamide conveyor and processing belts
These belts combine robust PA-traction layer construction with durable friction covers
Overview

Rubber conveyor and processing belts
A high durable friction coefficient combined with abrasion resistance are the key features of these versatile belts.
Overview

TPU conveyor and processing belts
These belts complete the Food TPU range in Habasit green and dark green. They are particularly suitable for applications with extreme conditions such as narrow transfer points, low temperatures or high abrasion. Some products are available in seamless widths beyond 4 meters.
Overview

Nonwoven conveyor and processing belts
Nonwoven belts differ in many ways from fabric-based belts. They consist of a fleece reinforced with a scrim fabric that is located in the center of the belt. This construction offers new features with regard to the generation of noise, damping effects and wear on the edges.
Overview

Extraline conveyor and processing belts
Extraline processing belts in widths of up to 4 meters seamless are intended for demanding applications such as those found in the textile printing, nonwoven, wood and materials-handling industries. They are made of superior raw materials using proven production processes.
Overview

Conveyor and processing belts
These Extraline belts are especially suitable for applications with extreme conditions such as narrow transfer points, low temperatures or high abrasion and are used in many different industry processes.
Overview

Crosslapper belts
Thanks to their excellent surface conductivity, smooth surface and transverse rigidity, Habasit Extraline crosslapper belts fulfill the requirements of modern web-laying machines in the nonwovens industry.
Overview

Deaeration belts
These processing belts are designed for use in the prepressing process of composite board manufacturing to allow an increase of the line speed by dearating the mat. These belts are the perfect complement to the range of Habasit Extraline prepress and forming belts.
Overview

Forming belts
Thanks to their specific design and metal detector suitability, Extraline Forming belts are the product of choice of leading machine manufacturers and panel board producers all over the world. These belts are

as well suited to many applications beyond the wood industry.
Overview

Prepress belts
The Habasit Extraline prepress belts provide high pressure and abrasion resistance as well as the excellent compression distribution that is necessary in composite board manufacturing.
Overview

Printing blankets
Habasit Extraline printing blankets have been the product of choice for textile printing machine manufacturers and end-users worldwide for many years. Perfect accuracy, chemical resistance and a long lifetime are features of all Habasit printing blankets.
Overview

TPU conveyor and processing belts

Overview

PVC conveyor and processing belts
The PVC belt line has been developed as general purpose conveyor belting for many different applications. A variety of surface finishes is available with different degrees of hardness and various colors. The range offers an excellent price-to-value ratio.
Overview

N-Line belts for general conveying
This line offers a broad combination of strength classes, surface structures and colors. The robust design guarantees a long lifetime in a tough environment.
Overview

N-Line food conveyor belts
Food PVC belts can be cleaned with many aggressive cleaning agents and high-quality plasticizers prevent hardening of the surface.
Overview

Standard conveyor belts
The Standard Line consists of a group of PVC products with a high degree of flexibility, top surface-quality and a variety of different surface structures.
Overview

Flame retardant belts
This line offers flame-retardant properties according to ISO 340 combined with robust design, low noise running and antistatic properties.
Overview

HySAN food conveyor and processing belts
HySAN - high oil resistant PVC food conveyor belts:
In order to fulfil an important customer need for food PVC belts Habasit developed HySAN®. This product range features a new and highly oil resistant PVC compound which allows applications in oily environment with elevated temperatures and cleaning with chlorine containing cleaning agents.
Industries specially interested in solutions like HySAN are:
- meat and poultry processing
- seafood/fish processing
- bakery (fatty dough and elevated temperatures)
- and many others; also non-food applications with oily or fatty conditions and elevated temperatures (e.g. applications in furniture paint drying/metal part conveying/transport of injection molded plastic products)
Overview

TPO conveyor and processing belts
The Cleanline® range of conveyor belts makes use of the food polymer Habilene, modified by Habasit. Cleanline® products were specially developed for food processing using state-of-the-art design.

Overview

Cleanline
Cleanline® food conveyor belts offer excellent release properties against all kind of sticky stuffs, combined with outstanding chemical resistance that withstand today's harsh cleaning agents.
Overview

O-Line tobacco conveyor and processing belts

Overview

P-Line tobacco conveyor and processing belts
P-Line offers new solutions for the tobacco industry using a modified, improved polyolefin and a complete product range. Because P-Line is made of Habilene®, the same raw material as for Cleanline, the belts can also be used in food applications.
Overview

PP conveyor and processing belts

Overview

TPU food conveyor and processing belts
Habasit offers an extensive food conveyor- and processing-belt line with a high quality coating of Thermoplastic Polyurethane (TPU) for all of today's food processes. TPU belts offer ultimate performance and a superior life span. They are made from premium raw materials in widths over 4 meters seamless using state-of-the-art processes.
Overview

Food conveyor belts
TPU food conveyor- and processing belts offer a broad variety of surfaces serving today's food processes. TPU belts feature ultimate performance in negotiating the smallest pulley diameters and even nosebars as well as demonstrating antistatic behavior.
Overview

HabaGUARD antimicrobial belts
HabaGUARD belts are specially equipped with antimicrobial substances that fullfill EPA and USDA regulations and supporting the HACCP approach.
Overview

Crosslapper belts

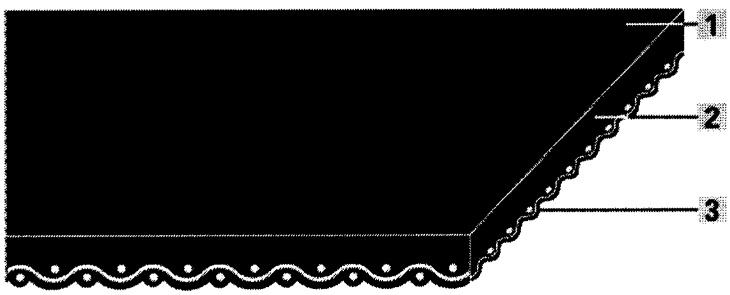
Product code	Technical Data			Product Construction/Design					Product Characteristics	
				Conveying Side				Traction layer		
	Thickness [mm]	Pulley diameter (minimum) [mm]	Tensile force for 1% elongation (k1% static) [N/mm]	Material	Surface	Property	Color	Number of Fabrics	Antistatic	Nosebar suitable
ENA-4EE	0.75	50	4	Polyurethane cross-linked (PUR)	Smooth	Non-adhesive	Black	1	Yes	No
ENA-8EE	1.0	50	10	Polyurethane cross-linked (PUR)	Smooth	Non-adhesive	Black	1	Yes	No
ENB-6EE	1.00	50	6	Polymer cross-linked	Smooth	Non-adhesive	Black	2	Yes	No
ENT-6EE	0.8	50	6	Polymer cross-linked	Impregnated fabric	Non-adhesive	Black	2	Yes	No

HabaFLOW Product Data Sheet
ENA-4EE

Product Designation

Product Group:	Extraline conveyor and processing belts
Product Sub-Group:	Crosslapper belts
Main Industry Segments:	Non-wovens
Belt Applications:	Crosslapper belt
Special Features:	Abrasion resistant; Electrically conductive surface; Low belt weight
Mode of Use/Conveyance:	Declined; Horizontal; Inclined

Product Design (enlarged)



Product Construction/Design

1	**Conveying Side (Material):**	Polyurethane cross-linked (PUR)
1	**Conveying Side (Surface):**	Smooth
1	**Conveying Side (Property):**	Non-adhesive
1	**Conveying Side (Color):**	Black
2	**Traction Layer (Material):**	Polyester (PET)
	Number of Fabrics:	1
3	**Running Side/Pulley Side (Material):**	Polyester (PET) fabric
3	**Running Side/Pulley Side (Surface):**	Impregnated fabric
3	**Running Side/Pulley Side (Color):**	Black

Product Characteristics

Slider bed suitable:	Yes
Carrying rollers suitable:	No
Power turns, curved installations:	No
Nosebar suitable:	No
Low noise applications:	No
Permanently antistatic:	Yes
Metal detector suitable:	No
Flammability:	No specific flammability prevention property
Food suitability, FDA conformance:	No
Food suitability, USDA recommendations:	Not conformable
Food suitability, EU conformance:	No

Technical Data

Thickness:	0.75	mm	*0.03*	*in.*
Mass of belt (belt weight):	0.75	kg/m²	*0.15*	*lbs./sq.ft*
Nosebar Radius (minimum):	NA	mm	*NA*	*in.*
Pulley diameter (minimum):	50	mm	*2*	*in.*
Pulley diameter minimum with counter flection:	50	mm	*2*	*in.*
Tensile force for 1% elongation (k1% static) per unit of width (Habasit standard SOP3-064):	4	N/mm	*23*	*lbs./in.*
Tensile force for 1% elongation after relaxation (k1% relaxed) per unit of width (Habasit Standard SOP3-155 / EN ISO 21181):	2.4	N/mm	*14*	*lbs./in.*
Admissible tensile force per unit of width:	6	N/mm	*34*	*lbs./in.*
Operating temperature admissible (continuous):	Min -10 Max 70	°C °C	*Min 14* *Max 158*	*°F* *°F*
Coefficient of friction on slider bed of pickled steel sheet:	0.15	[-]	*0.15*	*[-]*
Seamless manufacturing width:	4000	mm	*157*	*in.*

All data are approximate values under standard climatic conditions: 23°C/73°F, 50% relative humidity (DIN 50005/ISO 554), and are based on the Master Joining Method.

Additional Technical Information

Chemical Resistance Class:	6 (These indications are not guarantees of properties)
Installation and Handling Instructions:	Do not go below initial elongation (epsilon) ~ 0.3%; Install the slack belt and tension until running perfectly under the full belt load.
Limitations:	A perfect tracking of the crosslapper belt after the installation is absolutely necessary otherwise the belt edges could get damaged.; Do not use this belt on older and low speed machines.; Hint: on older and low speed crosslapper use the type ENA-8EE.; This light weight crosslapper belt is specifically developed for high duty crosslapper machines. Do not use it on older and low speed machines.; This product has not been tested according to ATEX standards (atmospheres with explosion risk - ATEX 95 regulation or EU directive 94/9) and therefore is subject to user's analysis in the respective environment.

Legend

*	No calculation Value
1)	No further authoritative acceptance since elimination of prior approval procedure of September 24, 1997, from USDA authority
2)	Product containing different coating materials such as elastomer, natural fibers, silicones, etc., are not subject to the directive 2002/72/EC
3)	CLA: Coordination of the centre line-average value Ra (in the US also Arithmetical Average (AA)) to the maximum peak to valley height Rt for surfaces manufactured by chip removal.
8)	Due to high coefficient of friction of running/pulley side, the suitability for use on slider beds is limited
BfR	German federal institute for risk assessment (Bundesinstitut fuer Risikobewertung)
EEC	European Economic Community
EU	European Union (Directive 2002/72/EC)
FDA	Food and Drug Administration
NA	Not available
NAP	Not applicable
USDA	United States Department of Agriculture (Food Safety and Inspection Service, Washington D.C.)
JFRL	Japan Food Research Laboratory

Product Liability, Application Considerations

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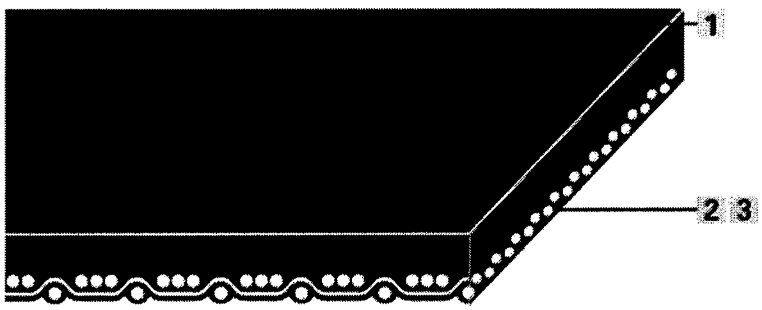
HabaFLOW Product Data Sheet
ENA-8EE

Product Designation

Product Group:	Extraline conveyor and processing belts
Product Sub-Group:	Crosslapper belts
Main Industry Segments:	Non-wovens
Belt Applications:	Crosslapper belt
Special Features:	Abrasion resistant; Electrically conductive surface; Low belt weight
Mode of Use/Conveyance:	Declined; Horizontal; Inclined

Product Design (enlarged)



Product Construction/Design

1	**Conveying Side (Material):**	Polyurethane cross-linked (PUR)
1	**Conveying Side (Surface):**	Smooth
1	**Conveying Side (Property):**	Non-adhesive
1	**Conveying Side (Color):**	Black
2	**Traction Layer (Material):**	Polyester (PET)
	Number of Fabrics:	1
3	**Running Side/Pulley Side (Material):**	Polyester (PET) fabric
3	**Running Side/Pulley Side (Surface):**	Impregnated fabric
3	**Running Side/Pulley Side (Color):**	Black

Product Characteristics

Slider bed suitable:	Yes
Carrying rollers suitable:	Yes
Power turns, curved installations:	No
Nosebar suitable:	No
Low noise applications:	No
Permanently antistatic:	Yes
Metal detector suitable:	No
Flammability:	No specific flammability prevention property
Food suitability, FDA conformance:	No
Food suitability, USDA recommendations:	Not conformable
Food suitability, EU conformance:	No

Technical Data

Thickness:	1.0 mm	*0.04 in.*
Mass of belt (belt weight):	1.0 kg/m²	*0.2 lbs./sq.ft*
Nosebar Radius (minimum):	NA mm	*NA in.*
Pulley diameter (minimum):	50 mm	*2 in.*
Pulley diameter minimum with counter flection:	50 mm	*2 in.*
Tensile force for 1% elongation (k1% static) per unit of width (Habasit standard SOP3-064):	10 N/mm	*57 lbs./in.*
Tensile force for 1% elongation after relaxation (k1% relaxed) per unit of width (Habasit Standard SOP3-155 / EN ISO 21181):	6 N/mm	*34 lbs./in.*
Admissible tensile force per unit of width:	12 N/mm	*69 lbs./in.*
Operating temperature admissible (continuous):	Min -10 °C Max 70 °C	*Min 14 °F* *Max 158 °F*
Coefficient of friction on slider bed of pickled steel sheet:	0.15 [-]	*0.15 [-]*
Seamless manufacturing width:	4000 mm	*157 in.*

All data are approximate values under standard climatic conditions: 23°C/73°F, 50% relative humidity (DIN 50005/ISO 554), and are based on the Master Joining Method.

Additional Technical Information

Chemical Resistance Class:	6 (These indications are not guarantees of properties)
Installation and Handling Instructions:	Do not go below initial elongation (epsilon) ~ 0.3%; Install the slack belt and tension until running perfectly under the full belt load.
Limitations:	This product has not been tested according to ATEX standards (atmospheres with explosion risk - ATEX 95 regulation or EU directive 94/9) and therefore is subject to user's analysis in the respective environment.

Legend

*	No calculation Value
1)	No further authoritative acceptance since elimination of prior approval procedure of September 24, 1997, from USDA authority
2)	Product containing different coating materials such as elastomer, natural fibers, silicones, etc., are not subject to the directive 2002/72/EC
3)	CLA: Coordination of the centre line-average value Ra (in the US also Arithmetical Average (AA)) to the maximum peak to valley height Rt for surfaces manufactured by chip removal.
8)	Due to high coefficient of friction of running/pulley side, the suitability for use on slider beds is limited
BfR	German federal institute for risk assessment (Bundesinstitut fuer Risikobewertung)
EEC	European Economic Community
EU	European Union (Directive 2002/72/EC)
FDA	Food and Drug Administration
NA	Not available
NAP	Not applicable
USDA	United States Department of Agriculture (Food Safety and Inspection Service, Washington D.C.)
JFRL	Japan Food Research Laboratory

Product Liability, Application Considerations

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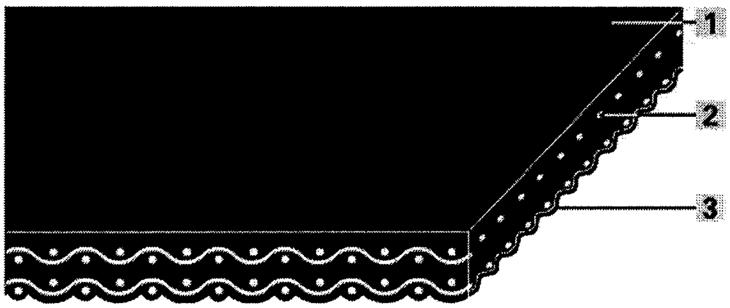
HabaFLOW Product Data Sheet
ENB-6EE

Product Designation

Product Group:	Extraline conveyor and processing belts
Product Sub-Group:	Crosslapper belts
Main Industry Segments:	Non-wovens
Belt Applications:	Crosslapper belt
Special Features:	Abrasion resistant; Electrically conductive surface; Longitudinal flexibility; Low belt weight; Ultimate chemical resistance; Very good lateral stability
Mode of Use/Conveyance:	Declined; Horizontal; Inclined

Product Design (enlarged)



Product Construction/Design

1	**Conveying Side (Material):**	Polymer cross-linked
1	**Conveying Side (Surface):**	Smooth
1	**Conveying Side (Property):**	Non-adhesive
1	**Conveying Side (Color):**	Black
2	**Traction Layer (Material):**	Polyester (PET)
	Number of Fabrics:	2
3	**Running Side/Pulley Side (Material):**	Polyester (PET) fabric
3	**Running Side/Pulley Side (Surface):**	Impregnated fabric
3	**Running Side/Pulley Side (Color):**	Black

Product Characteristics

Slider bed suitable:	Yes
Carrying rollers suitable:	No
Power turns, curved installations:	No
Nosebar suitable:	No
Low noise applications:	No
Permanently antistatic:	Yes
Metal detector suitable:	No
Flammability:	No specific flammability prevention property
Food suitability, FDA conformance:	No
Food suitability, USDA recommendations:	Not conformable
Food suitability, EU conformance:	No

Technical Data

Thickness:	1.00	mm	*0.04*	*in.*
Mass of belt (belt weight):	1.00	kg/m²	*0.2*	*lbs./sq.ft*
Nosebar Radius (minimum):	NA	mm	*NA*	*in.*
Pulley diameter (minimum):	50	mm	*2*	*in.*
Pulley diameter minimum with counter flection:	50	mm	*2*	*in.*
Tensile force for 1% elongation (k1% static) per unit of width (Habasit standard SOP3-064):	6	N/mm	*34*	*lbs./in.*
Tensile force for 1% elongation after relaxation (k1% relaxed) per unit of width (Habasit Standard SOP3-155 / EN ISO 21181):	4	N/mm	*23*	*lbs./in.*
Admissible tensile force per unit of width:	10	N/mm	*57*	*lbs./in.*
Operating temperature admissible (continuous):	Min -10 Max 65	°C °C	*Min 14* *Max 149*	*°F* *°F*
Coefficient of friction on slider bed of pickled steel sheet:	0.15	[-]	*0.15*	*[-]*
Seamless manufacturing width:	4000	mm	*157*	*in.*

All data are approximate values under standard climatic conditions: 23°C/73°F, 50% relative humidity (DIN 50005/ISO 554), and are based on the Master Joining Method.

Additional Technical Information

Chemical Resistance Class:	6 (These indications are not guarantees of properties)
Installation and Handling Instructions:	Do not go below initial elongation (epsilon) ~ 0.3%; Install the slack belt and tension until running perfectly under the full belt load.
Limitations:	A perfect tracking of the crosslapper belt after the installation is absolutely necessary otherwise the belt edges could get damaged.; Do not use this belt on older and low speed machines.; This product has not been tested according to ATEX standards (atmospheres with explosion risk - ATEX 95 regulation or EU directive 94/9) and therefore is subject to user's analysis in the respective environment.

Legend

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3)	CLA: Coordination of the centre line-average value Ra (in the US also Arithmetical Average (AA)) to the maximum peak to valley height Rt for surfaces manufactured by chip removal.
8)	Due to high coefficient of friction of running/pulley side, the suitability for use on slider beds is limited
BfR	German federal institute for risk assessment (Bundesinstitut fuer Risikobewertung)
EEC	European Economic Community
EU	European Union (Directive 2002/72/EC)
FDA	Food and Drug Administration
NA	Not available
NAP	Not applicable
USDA	United States Department of Agriculture (Food Safety and Inspection Service, Washington D.C.)
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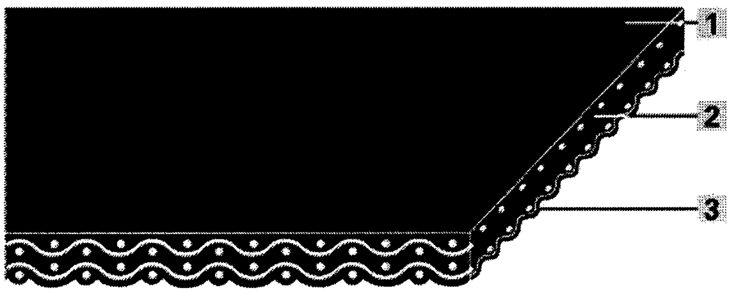
HabaFLOW Product Data Sheet
ENT-6EE

Product Designation

Product Group:	Extraline conveyor and processing belts
Product Sub-Group:	Crosslapper belts
Main Industry Segments:	Non-wovens
Belt Applications:	Crosslapper belt
Special Features:	Abrasion resistant; Electrically conductive surface; Low belt weight; Ultimate chemical resistance
Mode of Use/Conveyance:	Declined; Horizontal; Inclined

Product Design (enlarged)



Product Construction/Design

1	**Conveying Side (Material):**	Polymer cross-linked
1	**Conveying Side (Surface):**	Impregnated fabric
1	**Conveying Side (Property):**	Non-adhesive
1	**Conveying Side (Color):**	Black
2	**Traction Layer (Material):**	Polyester (PET)
	Number of Fabrics:	2
3	**Running Side/Pulley Side (Material):**	Polyester (PET) fabric
3	**Running Side/Pulley Side (Surface):**	Impregnated fabric
3	**Running Side/Pulley Side (Color):**	Black

Product Characteristics

Slider bed suitable:	Yes
Carrying rollers suitable:	No
Power turns, curved installations:	No
Nosebar suitable:	No
Low noise applications:	No
Permanently antistatic:	Yes
Metal detector suitable:	No
Flammability:	No specific flammability prevention property
Food suitability, FDA conformance:	No
Food suitability, USDA recommendations:	Not conformable
Food suitability, EU conformance:	No

Technical Data

Thickness:	0.8 mm	*0.03 in.*
Mass of belt (belt weight):	0.7 kg/m²	*0.14 lbs./sq.ft*
Nosebar Radius (minimum):	NA mm	*NA in.*
Pulley diameter (minimum):	50 mm	*2 in.*
Pulley diameter minimum with counter flection:	50 mm	*2 in.*
Tensile force for 1% elongation (k1% static) per unit of width (Habasit standard SOP3-064):	6 N/mm	*34 lbs./in.*
Tensile force for 1% elongation after relaxation (k1% relaxed) per unit of width (Habasit Standard SOP3-155 / EN ISO 21181):	4 N/mm	*23 lbs./in.*
Admissible tensile force per unit of width:	10 N/mm	*57 lbs./in.*
Operating temperature admissible (continuous):	Min -10 °C Max 70 °C	*Min 14 °F* *Max 158 °F*
Coefficient of friction on slider bed of pickled steel sheet:	0.15 [-]	*0.15 [-]*
Seamless manufacturing width:	4000 mm	*157 in.*

All data are approximate values under standard climatic conditions: 23°C/73°F, 50% relative humidity (DIN 50005/ISO 554), and are based on the Master Joining Method.

Additional Technical Information

Chemical Resistance Class:	6 (These indications are not guarantees of properties)
Installation and Handling Instructions:	Do not go below initial elongation (epsilon) ~ 0.3%; Install the slack belt and tension until running perfectly under the full belt load.
Limitations:	A perfect tracking of the crosslapper belt after the installation is absolutely necessary otherwise the belt edges could get damaged.; Do not use this belt on older and low speed machines.; This product has not been tested according to ATEX standards (atmospheres with explosion risk - ATEX 95 regulation or EU directive 94/9) and therefore is subject to user's analysis in the respective environment.

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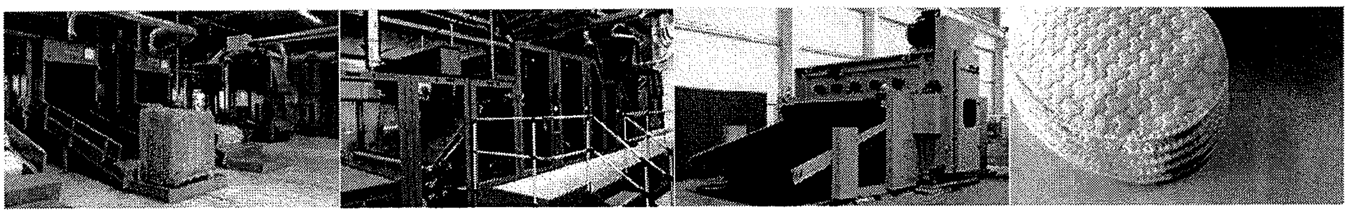
EXHIBIT V

Welcome to the DILO GROUP
FOR NONWOVENS TECHNOLOGIES

DILO TEMAFA OPENING · BLENDING | DILO SPINNBAU CARDING | DILO MACHINES CROSSLAPPING · NEEDLING | DILO SYSTEMS ENGINEERING · GENERAL CONTRACTOR



The international specialist for nonwovens machinery including opening, blending, carding, crosslapping and needling. Our textile machinery and complete nonwoven lines are renowned worldwide for highest productivity, reliability and production efficiency.

Together with partners we also provide complete lines including other bonding technologies like thermo-bonding, water-entanglement and chemical bonding. The range of nonwoven products manufactured on Dilo lines include floor coverings, mattress and upholstery materials, medical, cosmetic and hygienic products, wipes, technical felts for cars, filtration material, geotextiles and roofing material, sound and heat insulation material, papermachine felts, synthetic leather.

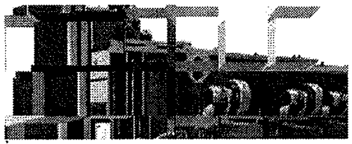
Textilmaschinen

Vliesstoff-Herstellungsmaschinen

Nadelfilzmaschinen

Nonwovens

Vlieskrempel



Engineering Excellence in Needle Looms

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- Go

Services

- spare parts
- field service
- research center
- training

Contact

DILO Germany

69412 Eberbach/N.
Im Hohenend 11
Germany

phone (+49) 62 71 940-0
facs. (+49) 62 71 7 11 42

E-Mail: Oskar Dilo Maschinenfabrik KG

http://www.dilo.de

Ladies and Gentlemen,

We would like to welcome you to our website and are pleased by your interest. Together with our group companies DILO is the worldwide leading supplier of machines and production lines for the nonwovens industry. Our SPINNBAU cards, DILO needlelooms and complete production lines including opening and blending components from TEMAFA are characterized by the highest productivity and efficiency as well as superior web quality and evenness. Numerous innovations and inventions of the DILO Group have repeatedly contributed to progress in the nonwovens industry. In partnership with our customers we continuously work to increase the efficiency of our machines and to develop new technologies and improved nonwoven products in our Textile Technology Centres. The performance of our production lines can be demonstrated and evaluated with your fibre material.

In close cooperation with leading partner companies we do not only offer complete installations for needling but also for other consolidation technologies such as thermo-bonding, water-entangling or chemical impregnation.

We kindly invite you to visit our Textile Technology Centre and would be pleased to arrange a suitable meeting and trial time for you.

J. P. Dilo
CEO

Textile Technology Centre in Eberbach

News

25.07.2008
new geotextile advertisement

- more details

30.05.2008
New advertising campaign 2008

- more details

Exhibitions

- CINTE Techtextile 2008 (Shanghai, PR China)
- EXINTEX 2008 (Mexico City, Mexico)
- International Conference on Technical Textiles and Nonwovens (New Delhi, India)
- India ITME 08 (Bangalore, India)
- Simatex 2008 (Buenos Aires, Argentina)

Jobs

Professionals
Education
Training

EXHIBIT VI

RAMCON-FIBERLOK

INCORPORATED

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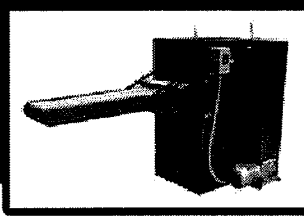

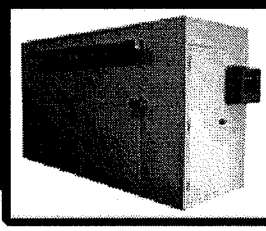

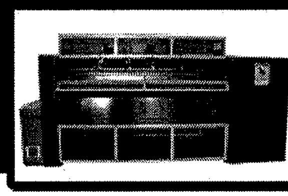

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- Resins
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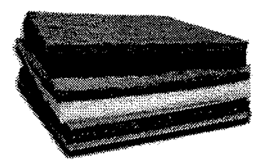
Ramcon-Fiberlok, Inc. is a manufacturer of custom machinery for the nonwovens industry. We make top of the line slitters, cross-cutters, cross-lappers, automatic pad stackers, ovens, coolers, floor apron systems, dry powder resin applicators and other auxiliary equipment.

Also, over 25 years ago Ramcon-Fiberlok, Inc. pioneered a non-phenolic dry powdered bonding process for nonwoven applications. Today, through years of research & development, we are able to offer a line of economical, high performance bonding resins to the bedding & furniture, building and automotive industries.

Ramcon-Fiberlok can provide you with a complete manufacturing package from the process technology to bonding resins to production lines for the manufacture of medium- to heavy-weight nonwoven products.



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RAMCON-FIBERLOK INCORPORATED

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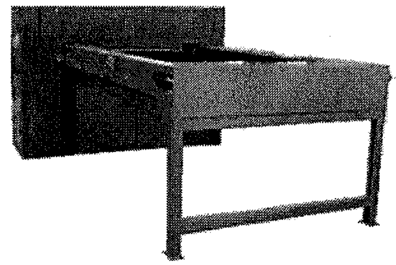
High Speed Horizontal Cross-Lapper

Revolutionary Design



- Up to 200 feet per minute
- 120" lay-down width
- No web transition points from entry to exit of lapper
- Self guided, high quality conveyor belts with non-metallic lacing
- Compact modular design
- Minimum space requirement
- Pre-assembled shipment for minimum installation time
- Shaft mounted reversing gearmotor for carriage drive (no clutches!)
- Shaft mounted gearmotor for conveyer drive
- Light weight, precision guided lay-down carriage and conveyor support carriage, on timing belt drives
- Electronic adjustment of lay-down width, adjustable during operation individually controlled for each side
- Automatic or manual operation (In "AUTO" cross-lapper follows card or garnett speed)
- Totally enclosed but easily accessible for routine service
- Economically priced

Video: Ramcon Stratumiser IV Crosslapper (2:55)

High Speed Horizontal Cross-Lapper
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APPENDIX III

RELATED PROCEEDINGS

None